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Awareness and Education of E-Learning

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WPI

POLYTECHNIC OF NAMIBIA

Awareness and Education of E-learning at the Polytechnic of Namibia

An Interactive Qualifying Project submitted to the faculty of
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Sponsoring Agency: Centre for Teaching and Learning, Polytechnic of Namibia
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Abstract

E-learning at the Polytechnic of Namibia is underutilized. Students are excited to use E-learning, but access and awareness are limited. We determined ways to improve the implementation of E-learning and its mobile device accessibility. We also produced a tutorial series, formed two student support groups, and developed an awareness plan. We recommend that the PoN use the tools we developed, increase the number of courses using MyPoly, begin a laptop rental program, and create an SMS alert system.

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All PoN students who participated in our research

Authorship Page

Every member of our team contributed to the background research, writing, editing, and data entry during the preparation of this report. All members distributed and collected survey questionnaires from students and took notes during focus groups. A detailed breakdown of the tasks performed by each member of the group is included below.

Edward Mercer designed the new logos for MyPoly and E-Portsocial. In addition, he was responsible for compiling the results from the focus groups as well as analyzing those results. Edward also developed the awareness plan and created flyers and posters to distribute to the PoN.

Sylvia Parol created the tutorial series and worked with Fortune Mukanya to record the voiceover clips. She was the moderator for the focus groups as well as the primary liaison to the students. She presented to the students at the General Student Assembly. She chaired the first meetings with the Student Liaison group and was responsible for contacting interested students.

Stephen Peters programmed the database used for lecturer workshop signups. He analyzed the survey results using a database he programmed. He assisted Sylvia in making the tutorial series by editing the scripts and compiling the tutorial footage. He presented to the students at the General Student Assembly. Stephen also created the Mobile Learning Poster.

Hunter Putzke wrote the scripts for the tutorial series. He also wrote the first draft of ‘Results, Analysis, and Deliverables’ and ‘Conclusions and Recommendations’ chapters. Hunter created the graphs and charts. He maintained the reference list and appendices. He also assisted Sylvia in making the tutorial series by compiling tutorial footage.

List of Acronyms

COLL: Centre for Open and Lifelong Learning

CTL: Centre for Teaching and Learning

CUS: Computer User Skills

E-learning: Electronic Learning

ICT: Information and Communication Technology

LMS: Learning Management Systems

M-learning: Mobile Learning

PoN (also "Poly"): Polytechnic of Namibia

SMS: Short Messaging Service

SRC: Student Representative Council

Table of Contents

Table of Figures

Table of Tables

Executive Summary

With recent advances in computers, the Internet, and mobile devices, technology has come to play a greater role in education. Electronic learning (E-learning) initiatives have become more popular in educational institutions to supplement curricula. The Polytechnic of Namibia (PoN) provides students and lecturers with the following tools: MyPoly, a Moodle-based E-learning platform, and E-Portsocial, an educational social network, both of which have mobile functionality. Although the Centre for Teaching and Learning (CTL) at the PoN has fully developed these tools, they are not integrated into most courses offered.

These tools are very useful for supplementing students' education, but the CTL has experienced a few difficulties with their implementation. First, the PoN has limited computers for students to use. Second, lecturers teach many classes and feel they do not have the time to learn how to use these new technologies. Third, the CTL is understaffed and cannot always keep up with demand for technical support from students and lecturers. The goals of this project were to improve the implementation of MyPoly and E-Portsocial by identifying the level of awareness of these tools and developing means of increasing awareness accordingly. Additionally, we sought ways of improving accessibility to the E-Learning programs through the use of mobile technology. To achieve these goals, we pursued the following objectives:

1. Determine the level of awareness of MyPoly and E-Portsocial
2. Determine which aspects of MyPoly are most beneficial to the students
3. Determine the distribution and usage of mobile technology at the PoN
4. Develop means of increasing the usage of MyPoly and E-Portsocial
5. Implement support structures for effective use of these tools.

To achieve the first three objectives, we used focus groups and a survey. Through the use of informal interviews and discussions, we found that creating an awareness plan would be an

effective approach to achieving our fourth objective. The awareness plan would consist of logos, flyers, posters, table sitting, presentations, and student involvement. After analyzing the effectiveness of methods that other institutions use to support their E-learning users, we opted to establish student support structures. We will now present our findings on each of these objectives.

We found that many students had heard of MyPoly, but most students recognized it under the name ‘E-learning.’ However, very few students had heard of E-Portsocial, let alone used it. Thirty percent of students felt there were obstacles preventing their access to these online web tools. Students cited problems with Internet access and speed at the PoN in addition to their lecturers not posting course information to MyPoly. Despite a lack of awareness and these obstacles, students still showed excitement and eagerness to use these tools. These findings confirmed the need for a plan to increase the usage of both MyPoly and E-Portsocial.

MyPoly has many different features. We wanted to discover which of these features students were most interested in using. We found that the most popular features were downloading lecture notes, online assignments, and increased opportunities for communicating with their lecturer. These findings highlight the key aspects of MyPoly for our awareness plan.

We found that nearly all students own a cell phone, 80% of which have Internet capabilities. Additionally, 22% of students who own an Internet-enabled cell phone do not own a laptop. However, there was a large difference in the number of students already using their cell phones for educational purposes and the number of students who expressed an interest in doing so. Our results revealed two possible explanations of their limited mobile access: cost of Internet access and speed of mobile devices.

In light of our findings, we created the awareness plan to increase usage of the tools. We designed simple, relatable, and thematically linked logos for MyPoly and E-Portsocial to emphasize that they complement each other. The posters and flyers we created showcase the

MyPoly, E-Portsocial, and mobile learning features we found most popular among students. Table sitting and presentations allowed us to directly engage the student, instilling genuine interest in these tools. Finally, we established the Student Liaisons to act as the bridge between the CTL and the student body. These students will continue to promote the tools as they evolve using the awareness plan we developed.

We decided upon two support structures: a tutorial series and the Student Tech Support group. The series consisted of 15 individual tutorials each demonstrating a particular task in MyPoly. The program that we used to create the tutorials, Prezi, allows for easy modification. The Student Tech Support group is comprised of individuals knowledgeable in the functions of MyPoly and E-Portsocial and aims to support the PoN community in using these tools.

Based on our results, we created a series of recommendations. First, we suggest the CTL continue to utilize and expand the Student Liaisons and Student Tech Support groups. These students will provide support in assisting the increasing number of users. Next we recommend that the CTL increase the number of lecturers educated in using MyPoly by providing them with personalized training workshops. This will improve the quality of the courses on MyPoly. To educate students, we recommend that some of the MyPoly tutorials be shown during the first year orientation, first-year classes, and the Computer User Skills courses.

We recommend the PoN continue their efforts to improve Internet speed and access on campus. This will enable students to fully utilize the resources provided to them by the CTL. Additionally, we recommend that an SMS alert system be created for MyPoly to cater to those students without an Internet-enabled device. The students who opt into this program will receive SMS alerts when their lecturers post updates and course materials on MyPoly. In conjunction with the SMS alert system, we recommend the PoN implement a laptop rental system. This system would provide students who do not own their own laptop the means to access the E-learning platforms. These changes will assist in further expansion of the E-learning program.

Chapter 1: Introduction

The Centre for Teaching and Learning (CTL) at the Polytechnic of Namibia (PoN) has recognized the advantages of E-learning, and, after careful consideration, has decided that the benefits outweigh the costs associated with its implementation (PoN, 2010, pp. 61-64). The CTL seeks solutions to the various obstacles to E-learning at the PoN. These obstacles include the following factors: a lack of consistent student access to computers, a largely commuter based student body who generally lack Internet access at home, and a faculty whose current obligations already stretch them and thus may be unwilling and/or unable to invest their time in learning how to use the software (M. Nkusi, personal communications, January and February, 2013). Students and faculty rarely, if ever, use MyPoly, the course management software used by the PoN, and even fewer students have heard of E-Portsocial, the PoN's new student social network.

E-learning has spawned a wealth of up-to-date research. Research into E-learning tends to focus on two specific topics: issue- or institution-specific E-learning. Issue-specific topics include ways to improve E-learning regardless of the tools used, while institution-specific research highlights problems at one institution. Issue-specific research is abundant, while institution-specific research has remained limited because of its nature. At the PoN, institution-specific research has been carried out only on the limited rates of adoption and on certain technical issues (Leporini & Buzzi, 2010).

The CTL does not know why students are not using MyPoly or E-Portsocial. In addition, the use of mobile devices for teaching and learning as a whole remains a relatively new concept for the PoN. What specific issues face the PoN that hinder the adoption of an E-learning system? By answering this question, the CTL can overcome the obstacles that constrain its E-learning program and improve education at the PoN.

The goals of this project were to improve the implementation of MyPoly and E-Portsocial by identifying the level of awareness of these tools and developing means of increasing awareness accordingly. Additionally, we sought ways of improving accessibility to the E-Learning programs through the use of mobile technology. The CTL provides E-learning support and education to the lecturers but does not have any systems in place to assist the students. For this reason, our project will focus on the student aspect of E-learning. Using a survey and focus groups we determined that the E-learning tools, especially E-Portsocial, were widely unused. In light of these findings, we created an awareness plan to increase the number of students using the tools and support structures to ensure students were using the tools effectively. We also identified the capabilities of the software the CTL provides with regards to usage via mobile devices. Mobile devices could be a means for overcoming the lack of student access to computers. Our results will assist in the successful implementation of the new E-learning tools at the PoN and will provide the CTL with knowledge and tools for supporting the students of the PoN.

Chapter 2: Background

The emergence of E-learning has changed the face of education. To better explain the strategies that have been used to increase implementation of educational web tools, we will discuss the history of E-learning, use of social networking and Moodle in educational institutions, and the history of education in Namibia.

2.1 Evolution of Education

The use of technology for educational purposes has advanced at different rates around the world. In the United States, students have access to many forms of education including traditional schooling, home-schooling, boarding schools, and today, cyber learning (PBS, 2001). Teachers choose varying methods to deliver their curricula such as interactive learning, lecturing, or even reversing roles and allowing the students to do the teaching (Hu, Clark, & Ma, 2003, p. 231). Technology has affected the forms of education available as well as the methods used to deliver information in these settings. In the 1990s and early 2000s, teachers rented out TV carts to show movies during class or displayed documents via overhead projectors. As technology progressed, teachers displayed lecture material on digital projectors through PowerPoint, saved whiteboard notes using SmartBoards, and kept students up to date with their homework assignments via online portals (p. 228).

Japan is a strong advocate of using technology in learning. Their national policy has been focused on promoting E-learning in the classroom (Sakamoto, 2002, p. 9a). Japan's policy continues to emphasize the need for information technology in the classroom by implementing Internet use and working to train staff members as a support team. Further adoption of technology enabled the growth of distance education through broadcasting lectures and

videoconferences via satellites. Japan is still adapting to these new technological assets, but they have been steadily working to set a standard for global competition in this industry.

It is important to note that the technological innovations in education in the United States, Western Europe, and Japan are not representative of the global status on this issue. Worldwide, enrollment in tertiary education is low in developing countries: "People living in developing countries account for 85 percent of the world's population but little more than 50 percent of the world's university students" (Bloom, Kremer, & Sperling, 2007, p. 14). Low quality education, unmotivated teachers, and a lack of funding are some factors that explain this low achievement level. For instance, students from countries like Bangladesh, Brazil, and India learn by rote memorization but are not taught to use critical thinking skills to analyze a simple problem:

> On a survey of rural children aged 11 and over in Bangladesh, 58 percent of children failed to identify at least seven of eight letters that were presented to them. In Brazil, 78 percent of children cannot answer simple math problems. In India, when given the sentence, "The dog is black with a white spot on his back and one white leg," 28 percent of 6th graders could not correctly answer if the color of the dog was mostly black, brown, or gray (p. 16).

A major issue in these institutions lies in the lack of variety in classroom activities. Students are not taught to use knowledge wisely if they are only asked to recite it rather than apply it to solving an unfamiliar problem. To improve the quality of education, many institutions are introducing E-learning technologies into the classroom.

2.2 E-learning

The phrase "E-learning" has many interpretations; some people believe it refers to online classes or tutorials, while others see it as the use of tools like PowerPoint used in classrooms (Wali, Winters, & Oliver, 2008, pp. 42-47). Different interpretations of E-learning lead to

drastically different benefits, challenges, and uses (pp. 54-56). We define E-learning as providing students access to technology used to facilitate learning. Thus the use of software such as PowerPoint to present material in the classroom setting would not be termed E-learning. Instead there must be some technology in place that allows the students to actively pursue their education such as access to a personal computer to view materials in the classroom, or a course management website like Moodle.

E-learning tools and practices have been implemented in many different ways around the globe, providing an immense amount of data on the subject. Many different approaches and methods exist in E-learning, each with its own advantages and disadvantages. For instance, many institutions now provide complete courses online, giving access to education to those students who do not have the means of traveling to a campus (PoN, 2013a). This method is also much less expensive than a traditional class, since there is no need for a physical classroom or, in certain cases, a professor. However, some experts argue that personal connections have an important role in education, and that by moving education entirely online, one misses out on a lot of potential learning (C. Elwell, personal communication, February 1, 2013).

E-learning is a global trend experienced not only by the countries spearheading the movement, such as the United States and Japan, but also in developing countries such as Iran, Namibia, and India (Ghaemi, 2011; Bentley, Selassie & Shegunshi, 2012). India has worked on implementing Learning Management Systems (LMS) to webcast professors' lectures online and assist with other E-learning tasks (Malik, 2012, p. 35). One university, known as the Indira Gandhi National Open University, has a "digital repository of content, webcasting through satellite and other broadcasting mediums as well as virtual classrooms" (p. 37). The Indian Institute of Technology [IIT] (2010), a globally competitive university, has also embraced distance learning initiatives, specifically by using "two way audio and video links" to promote faculty and student interaction. The university's Educational Technology Services Centre

provides support for the community through their faculty development programs, video transmission of educational content, and continuing involvement in relevant research.

Gilson Institute of Higher Education, a Swiss institution in India, used "Profiles, Mail, Lessons, Resources, Announcements, Discussion Forums, Assignments, Drop Box and Tests and Quizzes" (Malik, 2012, p. 41) in their first web-tool implementation. China's Nanyang Technical University had a two-phase E-learning implementation. The first phase focused specifically on E-learning and educational content, while the second phase focused on blending E-learning with face-to-face interaction (p. 39). It is evident that many other countries are looking to take steps into developing E-learning. Although the rate of advancement differs depending on geographical location, the world as a whole is beginning to adopt and integrate these E-learning trends.

There still remains a lack of strong and consistent Internet access in sub-Saharan Africa, but many institutions attempt to use E-learning in their classroom curriculum. According to Giancarlo De Agostini (2010), The Iberoamerican Online High School Project provides a virtual curriculum for at-risk students who may not function well in a normal classroom setting (p.1). The curriculum uses desktop computers and mobile devices to share educational materials. The program has saved teens in gangs, given women a greater chance for education due to generous scholarships, and used innovative teaching methods. The program uses Moodle for "the entire learning community, integrating databases, interactive resources, and tools, Internet forums, wikis, scorm [shareable content object reference model], lams [local area multicomputers], etc." (p. 3).

The benefits of E-learning are numerous. Effective design of computer programs allows for improved course and administrative organization. According to Cheryl Elwell, the Director of Academic Technology Services at Clark University (personal communication, February 1, 2013), the use of electronic tools can automate traditionally tedious tasks such as handout distribution, assignment collection, and even grading and evaluation. Electronic tools also allow

for easy access to previous material, allowing students to access materials before and after they are presented in the class so they can prepare for a discussion or review material that has already been presented. Brenda Peters (personal communication, January 26, 2013), a specialist in the field of Special Education, refers to these practices as an effective learning strategy. Implementation of these tools allows more classroom time for discussion and problem solving activities and leaves logistics to the online portals.

2.2.1 Barriers to E-learning

While the benefits of E-learning are compelling, poorly designed or implemented tools and strategies can do more harm than good. Faculty need to be educated in the capabilities of information and communication technology (ICT). If a professor does not know how to access and use the Internet, there is no way to successfully implement virtual environments (Carr-Chellman, 2005, p. 220). Professors must also learn how to smoothly integrate these methods into their curricula. Moreover, training faculty in how to use these technological resources is expensive, and many institutions are unwilling or unable to pay for effective training (p. 216). Additionally, technology requires maintenance to function effectively. Many institutions do not have the staff to maintain their technologies. Without maintenance, E-learning environments will be unable to flourish. A lack of proper support services makes the transition to E-learning difficult.

Students may also require education in proper use of technologies. Just because the technology is available to the students does not mean they will have the knowledge required to use it. Additionally, students enrolled in distance learning have expressed frustration over having inadequate support services to assist them in their studies (p. 217). Some services can be provided online, but sometimes a student needs personal interaction with a tutor, advisor, or professor for help. Some of these students also have difficulty commuting to learning centers. A

student enrolled in a virtual curriculum may only have one opportunity to visit a learning center to speak with administrators, fill out paperwork, or meet one-on-one with a tutor. However, lack of a form of transportation or inclement weather may make this center inaccessible for the student (Mbukusa, 2009, p. 6). Students and teachers need training and support services for effective E-learning implementation.

2.2.2 Moodle

Moodle, a Course Management System, brings versatility and benefits to learning and education by allowing teachers and professors to implement web technology into their courses (Cole & Foster, 2007). This open source web tool is not only used in grade schools, universities and community colleges, but in businesses as well. Computer scientist Martin Dougiamas created Moodle, which stands for Modular Object-Oriented Dynamic Learning Environment. Moodle provides educators with the ability to upload and share materials, create forums and online discussions through chats, assign quizzes, record grades and gather and review assignments through online submittal (The College of the Holy Cross, 2013). Moodle allows for the easy access of educational materials posted online and facilitates more opportunities for communication amongst students and educators. Professors at The College of the Holy Cross in Worcester, MA, have already introduced Moodle into their curriculum to post important events, communicate with students via the "news forum" and group emails, and upload documents or relevant web links for homework assignments. Moodle, along with tools with similar functions such as Blackboard or social networks, create an educational environment that students are able to access and share much more frequently.

2.2.3 Social Networks as an E-learning Tool

Social networking can spark a deeper student-to-student educational experience. To be considered a social networking site, there are three defining factors (Nabeth, 2009, p. 2). First,

the user must be able to provide his/her name or nickname and any other information he/she wishes to share in some sort of profile. The profiles need to have the ability to be interconnected, listing these profiles as 'friends' or 'contacts'. The social site must also allow users to leave public comments on other users' profiles. Students have the opportunity to share their accomplishments, view the work of their peers, and engage in online peer-to-peer learning (p. 3).

Although social networks like MySpace and Facebook seemed to exclude academic purposes in the past, their tools and features can provide students with many educational benefits (Greenhow, 2011). On such sites, users can instantly share information across their network of friends. Whether it is an interesting news article, or a personal opinion about an issue, one click allows hundreds of people to view information instantly. Social networking opens users to different people's perspectives (p. 6). Posted information has a section for comments where other users can post feedback, offer advice through online chat, or offer support without having another person's physical presence (p. 7).

Mentornet, an Australian social network for female entrepreneurs, displays the professional and educational benefits of engaging in a social network (Bartlett-Bragg, 2009, p. 18). The network provides live webinar meetings and the opportunities to create individual business plans through the use of wikis. The women create media-rich user profiles to express their ideas and personalities to connect with similar users online. Due to the use of Mentornet, users find themselves more proficient in their business skills and connected with more industry professionals.

Despite the benefits, the use of social media tools is still limited in higher education (Hrastinski and Aghaee, 2011). In fact, most students have not taken advantage of the educational uses of social media. Many students feel that social media is less efficient than meeting in person, especially when it comes to creative endeavors. While students are capable of using social media to meet with group partners and classmates, according to a study conducted

by Hrastinski and Aghaee (2011), students use social media to supplement face-to-face collaboration. This can consist of scheduling meetings, discussing division of labor before meetings, or exchanging short answers, whereas more complicated issues are resolved in an offline meeting.

Social media sites in higher education are rarely integrated with course management systems, such as Moodle (2011). In general, the course management systems are used as a repository of course information rather than an enabler for collaboration (C. Elwell, personal communication, February 1, 2013). Full integration of social networking for the purposes of education is not yet fully developed. However, the tools and resources currently available make it feasible for an educational institution to begin this process.

2.3 Education in Namibia

Some institutions in Namibia promote usage of E-learning tools. However, cultural and societal obstacles from the past have posed some difficulty in making changes to the educational system. Tertiary education in Namibia began over thirty years ago, before Namibia's independence. Before 1980 and the founding of the Academy for Tertiary Education, all education beyond the high school level took place in South Africa (PoN, 2013d). During apartheid, the quality of education was linked to the race of the student (Kallaway, 2002). As a result, black students were not given the same resources as white students. The disadvantage imposed on black students from the start created yet another obstacle preventing academic success (Mbukusa, 2009, p.2). However, immediately after Namibia's independence the educational system changed considerably. The Namibian Governmental Act 33 of 1994 and Act 18 of 1992 founded the Polytechnic of Namibia and the University of Namibia, respectively (Government of Namibia, 1992; Government of Namibia, 1994). During the shift in power from authoritarian colonial structures to more democratic institutions, the quality of teaching methods

and education improved. Educational paradigms began to shift from lecturer-focused to student-focused pedagogy in certain areas, and the language of instruction was changed from Afrikaans to English (Meyer, 2003).

Education in Namibia is still improving with the addition of E-learning. Many educational institutions, at secondary school and higher education levels, have implemented E-learning in some form (Carr-Chellman, 2005, p. 208). The Iberoamerican online High School Project has a significant online presence in Namibia through their implementation of E-learning for distance learners (De Agostini, 2010). Additionally, at the Polytechnic of Namibia the Centre for Open and Lifelong Learning (COLL) is working on developing distance learning curricula (PoN, 2013b). Distance learning can be difficult to implement in a country like Namibia with inconsistent Internet access and a widely dispersed population, but institutions are slowly taking the necessary steps to use technology for its educational benefits.

2.4 Challenges for the Polytechnic of Namibia

Despite success with its distance E-learning program, the PoN has struggled with the effectiveness of their E-learning platform on its main campus (Maurice Nkusi, personal communication, January 16, 2013). The CTL has developed tools for their students and faculty including MyPoly and E-Portsocial. They also provide workshops to teach skills such as Android programming, and SmartBoard usage. Even though the tools for the E-learning platform are in place, the CTL has yet to reach their goal number of student and faculty users. There are still many steps that need to be taken to make the implementation effective, but the PoN's current initiatives and research projects will make these advances possible (PoN, 2013c).

Two of the major issues facing the Polytechnic of Namibia are a lack of computers and understaffing (Brooks, Ketterer, Price, and Rayworth, 2011). During an interview with Laurent Evrard, the PoN's head of the Bureau of Computer Services, it was stated that the student to

computer ratio was believed to be nearly ten to one (Albee, Hagger, Paula, & Perez-Rogers, 2012, p. 9). Due to poor access to computers, students often use smartphones and other mobile devices that are not optimal for accessing the E-learning platform (Brooks et al., 2011). Additionally, many professors do not have experience with MyPoly or any E-learning technology, nor do they have the time to learn how to use these tools due to heavy teaching loads (Albee et al., 2012).

In order to achieve increased student usage of the E-learning platform the CTL must first understand the reasons they are not currently using it. Once this has been determined they need the tools necessary to address the issues. In chapter three, we discuss how we carried out our research into these topics.

Chapter 3: Methodology

We aimed to make recommendations and provide resources designed to improve student use of MyPoly and E-Portsocial. To achieve this we identified the following research objectives:

1. Determine the level of awareness of MyPoly and E-Portsocial
2. Determine which aspects of MyPoly are most beneficial to the students
3. Determine the distribution and usage of mobile technology at the PoN
4. Develop means of increasing the usage of both MyPoly and E-Portsocial
5. Implement support structures for effective use of these tools.

In this chapter we explain our research methodology, which included a survey, focus groups, and informal interviews.

3.1 Determining Awareness of MyPoly & E-Portsocial

To gauge students' awareness of MyPoly and E-Portsocial, we conducted a survey and several focus groups. The survey (found in Appendix B) asked students if they had heard of MyPoly and E-Portsocial and what features of the tools they had used. We distributed this survey to 338 students across the PoN campus. Seventy-five of these students were from the English in Practice class surveyed on March 27th and the Agricultural Economics class surveyed on April 11th. We found the remaining students at various locations around campus, including the Lecture Building, the student kiosk, the cafeteria, outside of the library, and the Engineering Building. When the survey questionnaires were distributed, we explained that the survey results would be anonymous and that participation was voluntary. The surveying took place on March 27th, April 8th, and April 11th.

Our surveying gave us a reasonable cross-section of the student body; the following information is included to provide information on our sampling. One anomaly with our survey

distribution was an overrepresentation of students from the School of Natural Resources and Tourism (see Figures 1 and 2). We attribute this to the Agricultural Economics class, which consisted entirely of students in the Agriculture or Geomatics programs. In addition, the School of Humanities was underrepresented.

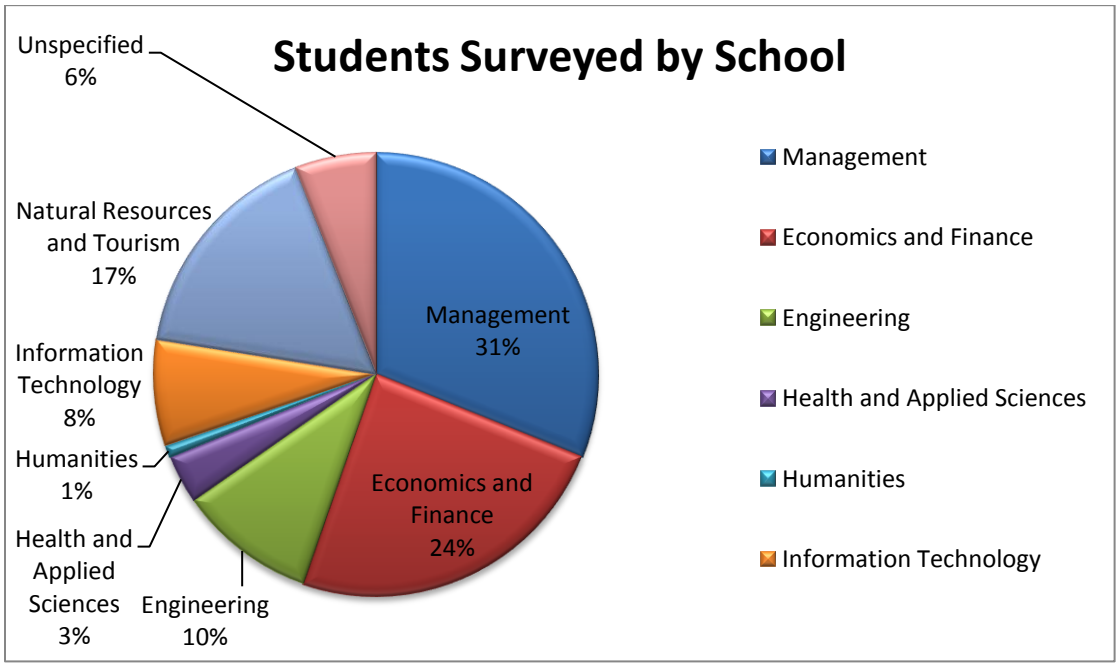

Figure 1: Distribution of responses by school.

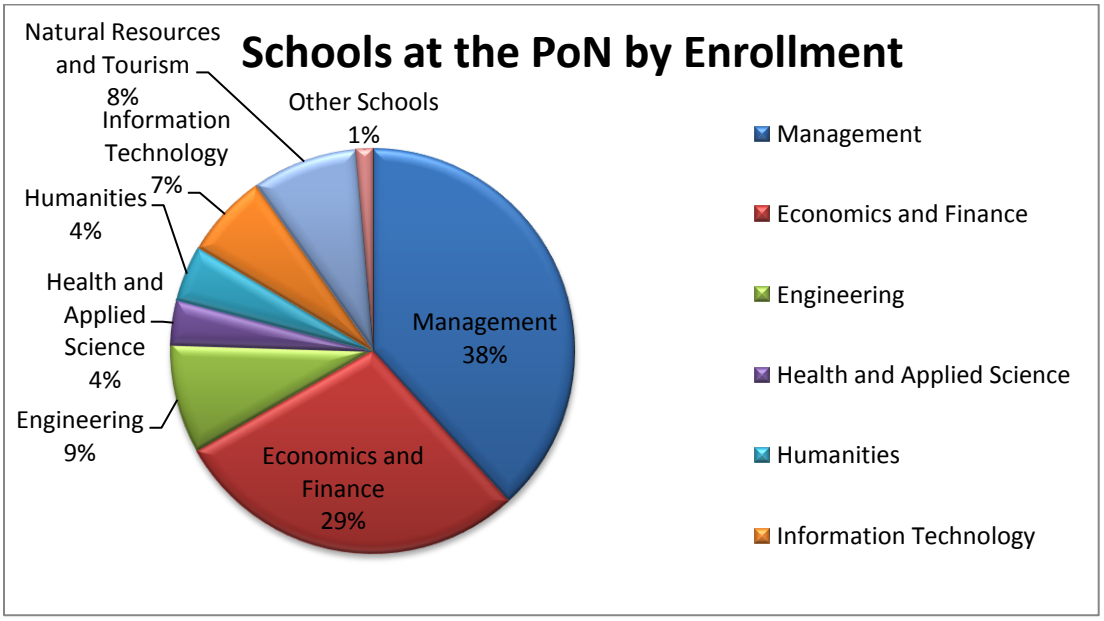

Figure 2: Distribution of students by school

(PoN, 2012).

Another concern was the representation of respondents by year of study. We found that our survey respondents were overrepresented by second year students and underrepresented by fourth year students (compare Figures 3 and 4). Our sampling method was potentially the cause of this discrepancy. After discussing the issue with students, we found that fourth-year students tend to be studying part-time. As we only sampled the student body during the day, we missed part-time students, who attend classes at night. The cause for the overrepresentation of second year students is unknown, but it is potentially due to the Agricultural Economics class, which consisted mostly of second year students.

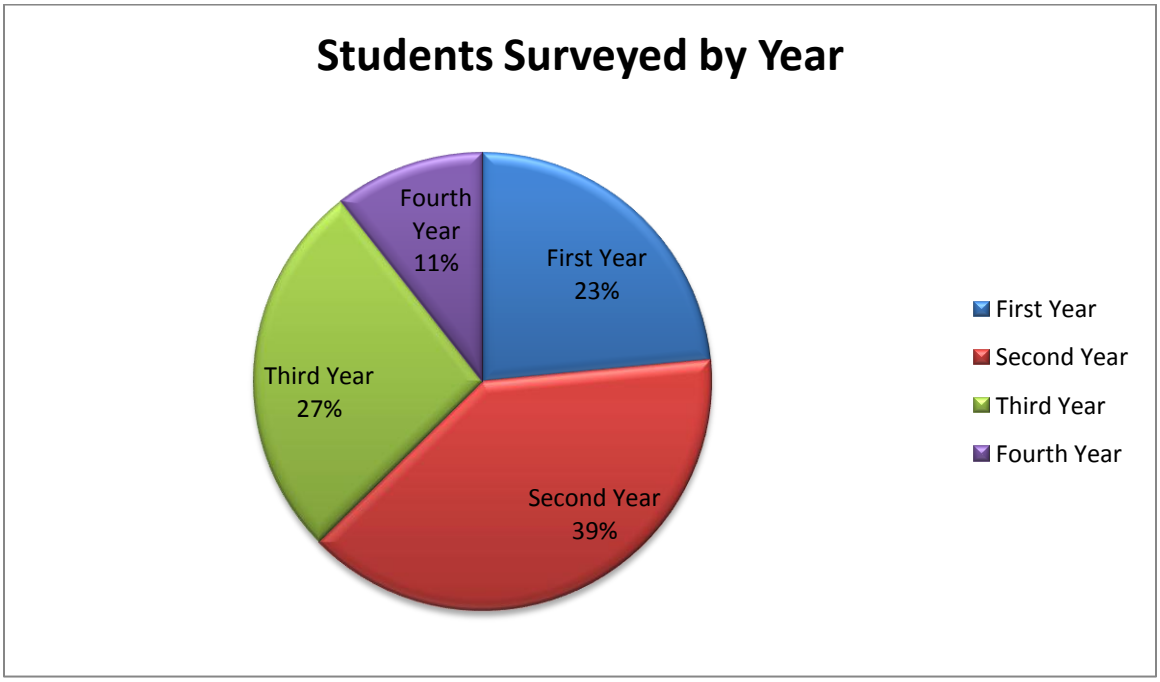

Figure 3: Distribution of responses by class year.

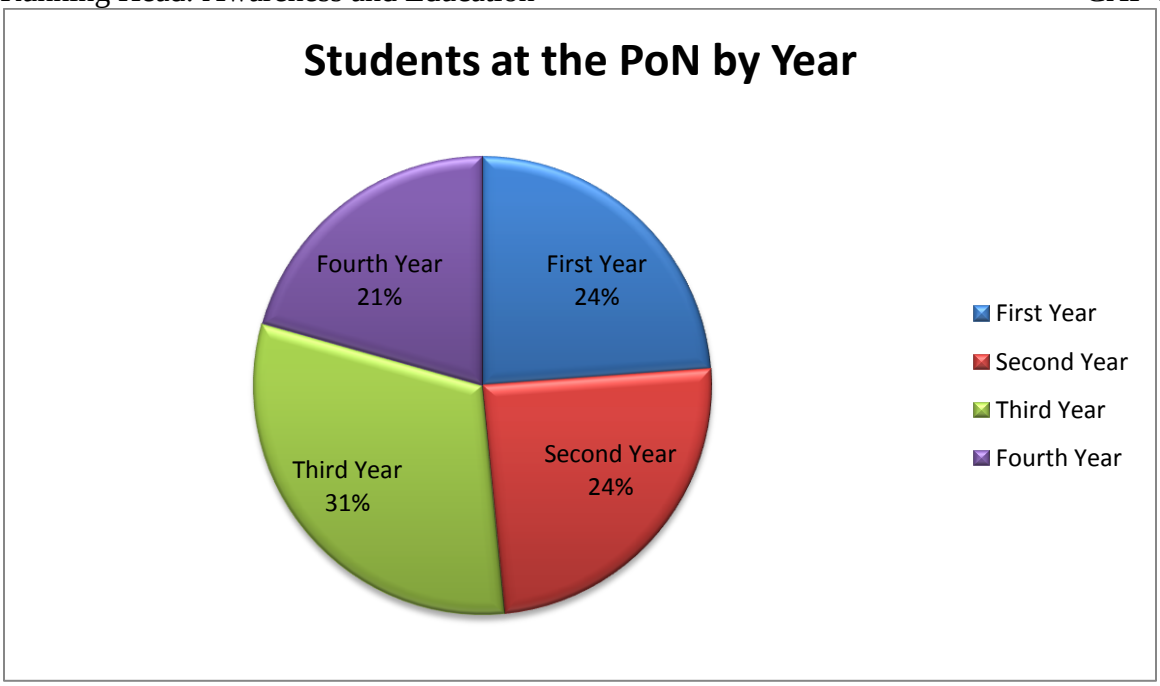

Figure 4: Distribution of on-campus students by class year

(Based on data from the PoN Registrar, April 18, 2013)

In order to support our survey findings, we conducted focus groups. The first focus groups consisted of students recruited by Fortune Mukanya, a graduate student in Information Technology (IT) from Zimbabwe, who was added to our project team by Mr. Nkusi. At the time of our project Fortune was writing her Master's thesis on social networks and education. Once the preliminary focus groups had been completed, we solicited volunteers from the general student population. Some of these volunteers came from the friends of students involved in the preliminary focus groups.

Each focus group included between six and twelve students. We ran four focus groups, all of which followed the format explained in Appendix C. Three members of our group were present in an observatory role, while the final member of our group was the moderator. The observers were responsible for recording the responses, discussion, and tone of the comments made, while the moderator was responsible for facilitating the discussions. We brought up the topics of MyPoly and E-Portsocial by asking the students what they knew about these tools and

how they used them. By observing the responses of the group we were able to gauge how many students knew about the tools and what they could be used to do.

3.2 Determine which Aspects of MyPoly are Most Beneficial

The survey and focus groups were also used to determine what students believed to be the most beneficial aspects of MyPoly. The survey had questions that listed different features of MyPoly and asked which of these features the student found most beneficial. This allowed us to get numerical data about which features would be most useful to students. In the focus groups, we asked what the students had used MyPoly for in the past and allowed the students to discuss these features amongst themselves. By gauging the responses to student claims we were able to discern the popularity of the discussed features. As students are the largest target audience of the tools, it was important to receive their perception.

3.3 Determine the Distribution and Usage of Mobile Technology

The third objective we approached using our survey and focus groups was determining the distribution and usage of mobile technology among students. Our survey asked students if they owned laptop and/or a cell phone with access to the Internet. It asked students for their year and course of study, allowing us to examine device ownership by year and school. Finally, the survey asked which features of E-learning students were currently using their cell phone for and in which features they were interested. To find out why some students do not own laptops we asked our focus groups and asked if they knew of any drawbacks or limitations to using a cell phone in place of a computer. Finally, we inquired about students' usage of cell phones for educational purposes.

3.4 Develop Tools to Increase the Usage of MyPoly and E-Portsocial

To decide which tools would be most effective in increasing the usage of MyPoly and E-Portsocial we analyzed the findings to our first three objectives, drew upon our background knowledge and research in marketing, discussed possibilities with the Student Representative Council (SRC) and members of the CTL, and presented our ideas to the focus groups for feedback. The results of our first three objectives identified some reasons why students were not using E-learning and the problems our tools should aim to address. Our background knowledge and research allowed us to select only the tools that would effectively address these problems.

Once we had chosen tools for consideration, we spoke with the SRC and CTL to discuss the effectiveness and feasibility of our choices. After using this feedback to further narrow our considerations we presented the remaining options to our focus groups. This process allowed us to tailor the tools we created to the needs of the PoN.

3.5 Implement Support Structures for Effective Use of these Tools

During our background research, we identified support structures as a commonly used tool in effective E-learning implementations. While our project is focused on the students, we understand the importance of educating lecturers about how to use MyPoly as well. The CTL already has plans for teaching lecturers including personalized workshops. Currently, Mr. Nkusi has lecturers e-mail him directly in order to sign up for these workshops; however, this practice is inefficient. We discussed with the CTL possibilities for improving this process.

The CTL also recognized the value of support structures for the students and, with the assistance of four Worcester Polytechnic Institute students (Albee et al, 2012), built a tutorial series to aid students in the usage of MyPoly. However changes to the layout of the E-learning platform rendered these tutorials ineffective. To determine which support structures, if any would aid the PoN in the transition to E-learning, we analyzed the results to objective three

(determining the distribution and usage of cell phones in mobile technology), examined the state of the E-learning platform at the PoN, discussed possibilities with the CTL, and presented some ideas to focus groups. We also analyzed the current and previous support structures implemented by the CTL to determine what aspects have proven effective.

Examining the state of the CTL's E-learning platform revealed the characteristics necessary to make effective support structures. We presented our initial ideas to the focus groups to determine if students thought the support structures would be effective or if any improvements could be made. With these audiences and characteristics in mind, we were able to narrow our considerations and present ideas to the CTL to see if they would be feasible.

3.6 Summary

E-learning at the PoN is still developing. There are still many issues to face in the E-learning program, but we have identified many of them through focus groups, a survey and informal interviews with community members. In the next chapter, we will present the analysis and results of our research.

Chapter 4: Results, Analysis, and Deliverables

In this chapter we present the results of our research according to our objectives. Specifically, we will present our findings on the level of awareness of MyPoly and E-Portsocial, which aspects of MyPoly are most beneficial to the students, the distribution and usage of mobile technology at the PoN, the tools we created to increase the usage of both MyPoly and E-Portsocial, and the support structures we created for these tools.

4.1 Awareness of MyPoly and E-Portsocial

We began by gauging awareness of MyPoly and E-Portsocial. Our initial impression was that neither tool was widely used. However, we learned that this was not entirely true: while most students had never heard of E-Portsocial, more than two thirds of students we surveyed had used MyPoly at least once (see Appendix D for more results).

MyPoly was widely recognized, but the students in our focus groups called MyPoly 'E-learning'. This hindered our discussion slightly as our first focus group questions referenced E-learning as a concept and later questions directly referenced MyPoly. One possible reason for the students calling MyPoly 'E-learning' is the large number of changes to the E-learning platform at the PoN that have occurred between 2010 and 2013. The program used has changed from KEWL to Chisimba to Moodle. Students also navigate to the MyPoly homepage by clicking a link titled "E-learning" on the Polytechnic homepage (see Figure 5), which may also cause some confusion about the name of the web tool.

Figure 5: e-Poly homepage with E-learning link circled.

Despite the student confusion about MyPoly, students were very excited to learn about the tool. During all four of the focus groups, students said that they would be willing to use MyPoly if the tool were explained to them (see Appendices E.1 through E.4). However, they also highlighted a drawback of MyPoly. Currently, students are only able to use MyPoly if the professor has activated a course site in MyPoly. Some professors do not update the course homepage throughout the term, rendering a course website useless to the students who take the time to check it. Several of the students mentioned that they would use MyPoly, but that they were waiting for their lecturers to use the site.

Regarding E-Portsocial, of the 338 students surveyed, only 14 had heard of E-Portsocial, and even fewer had used it. A social network's effectiveness depends on a critical mass of users, and currently, not enough students know about E-Portsocial to reach that critical mass. Our focus groups confirmed the low usage of E-Portsocial. Students had not created accounts on the site and did not show knowledge of its capabilities or existence. One student mentioned chatting with students on E-Portsocial; however, E-Portsocial does not have a chat capability, nor is it possible

to use E-Portsocial without creating an account. We believe this comment to be an indicator of confusion when referring to the different tools.

However, once E-Portsocial was described, the students expressed interested in using the social network. The electronic portfolio feature in particular garnered a significant amount of interest with 73% (27 of 37) of students reacting positively and the other 27% remaining neutral or silent. Some students were excited enough to ask for the link immediately after the focus group concluded.

Students from our survey were very interested in using E-Portsocial and MyPoly once they had become aware of them, with 95% (321 of 338) of students answering ‘yes’ to the question asking if they would be willing to use the educational tools provided to them. However, 30% (100 of 338) of students answered yes to the question that asked if there was something that was preventing them from using these tools. The most common reasons provided were Internet-related, specifically many dead zones around campus and limited bandwidth especially on the student network.

4.2 Beneficial Aspects of MyPoly

MyPoly has a wide variety of features, but not every feature is of equal utility for every course. Lecturers should dedicate time to using features that the students can use effectively. We directly asked students in our survey what features they are interested in using.

We found that 59% (199 of 338) of students were interested in using MyPoly to download lecture notes, by far the most popular use (see Figure 7). In addition, 37% (126 of 338) of students selected the homework feature of MyPoly, while 37% (124 of 338) also selected quizzes and tests. However, discussion forums were an unpopular feature, with only 12% (42 of 338) of students interested. This aligns with our expectations from talking with Mr. Nkusi and our personal experience.

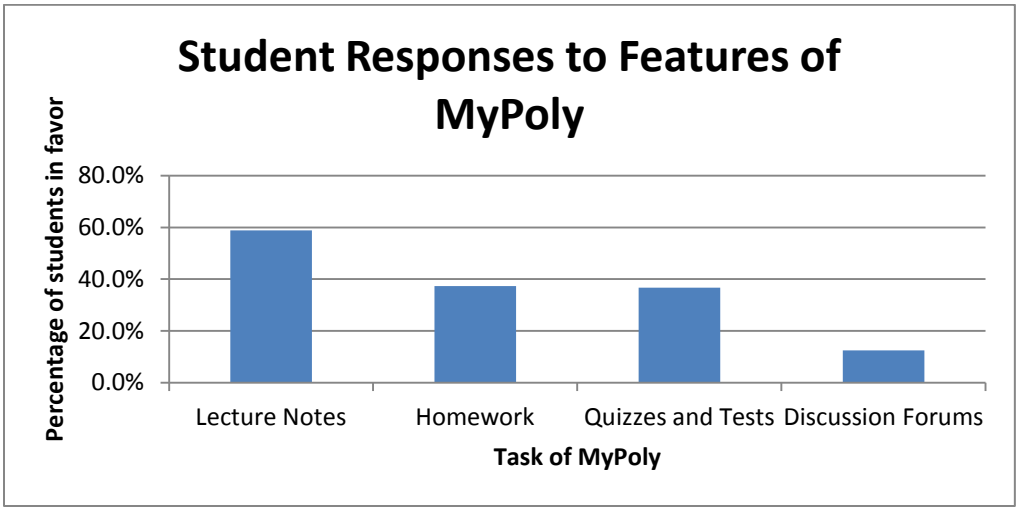

Figure 6: Student Responses to MyPoly

Although our survey findings did not show strong student interest in discussion forums, students in the focus groups were interested in using MyPoly to communicate with their lecturers in different ways, including discussion forums. They mentioned that lecturers often do not respond to questions in a timely fashion through current means of communication. They were hopeful that having further avenues for communication would encourage lecturers to respond more quickly. They were also hopeful that their questions could be answered by their peers in certain cases. Focus groups also noted the importance of checking their marks. Due to the lack of communication, students are often unsure of their standing with regard to marks. In addition, certain classes require a minimum threshold for marks to be met in order to write the final exam and receive credit. Students wanted to know their standing in the class in order to ensure that they would be allowed to write the final exam.

4.3 Mobile Technology Distribution and Usage

To increase the number of students with access to the E-learning platform, we looked into the feasibility of using mobile devices as replacements for computers. We address two questions with our research. First, we wanted to know which students own Internet-enabled cell phones, and if these students also owned laptops. Second, we wanted to know for what academic

functions students were currently using cell phones, and which they thought would be effective on a phone.

4.3.1 Distribution of Devices

We determined the state of mobile learning at the PoN. From our survey, we found that 79% (268 of 338) of students had a cell phone with Internet access, but this number was not consistent across academic years. After the second year at the PoN, there was a small jump in ownership of cell phones with Internet access. Just over 86% (78 of 89) of upperclassmen owned Internet-enabled cell phones, whereas only 75% (157 of 208) underclassmen did (see figure 6). Laptop ownership follows a similar pattern, with only 47% (37 of 78) of students owning laptops during their first year. The number jumps to 71% (92 of 130) for second year students and then rises throughout years three and four, as shown in Figure 6. These data suggest that using mobile devices as a replacement for the traditional computer will be most effective with the first year students, where 35% of them have a cell phone with Internet access but no laptop. Only 19% of second and third year, and 14% of fourth year students fall into this category.

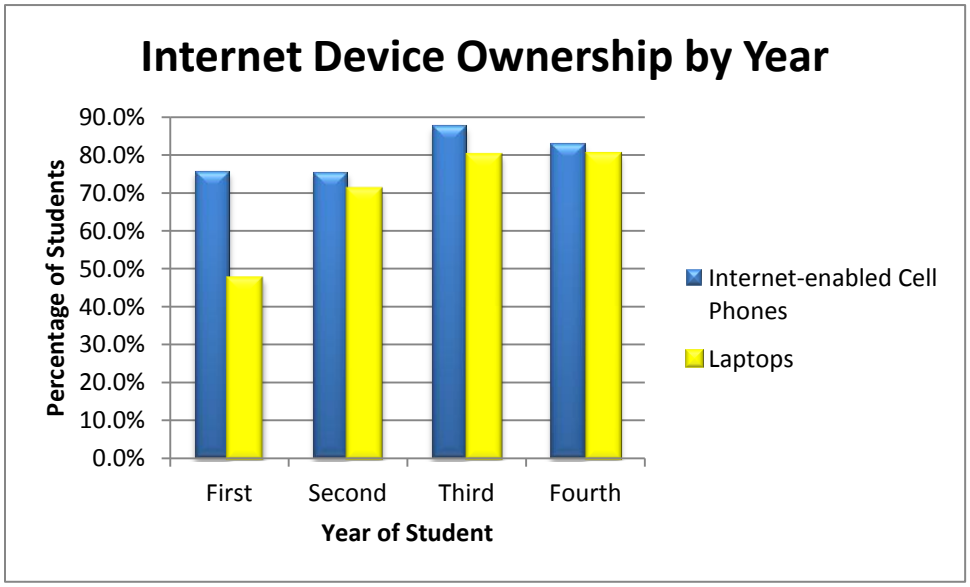

Figure 7: The ownership of Internet-enabled devices by year of student.

The rising Internet-accessible device ownership pattern can be seen when we combine the statistics from Internet-enabled cell phones and laptops (see Figure 7 for this result). Eighteen percent (14 of 78) of first year, 10% (13 of 130) of second year, 1% (1 of 89) of third year, and 6% (2 of 35) of fourth year students whom we surveyed reported owning no Internet-enabled device. Again, the rise of non-owners among fourth year students is curious but may be due to our small sample size of fourth year students.

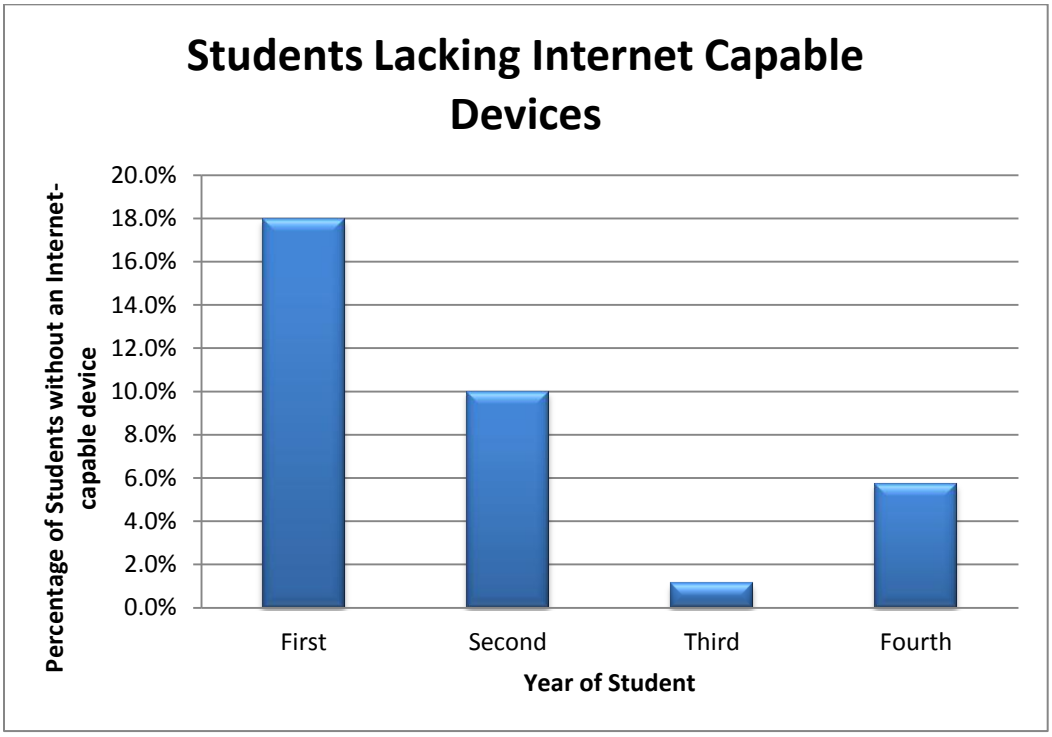

Figure 8: The lack of Internet-enabled devices by year of student.

What are some of the causes for these large changes in device ownership? According to feedback we received from our focus groups, some students arriving at the PoN do not know the importance of owning an Internet-enabled device. Many students from less developed regions and from poorer families lack computer skills. They only recognize the importance of having their own device to access the Internet after their first year, and thus purchase a laptop or Internet-enabled phone. Many students at the PoN apply for a loan from the government to pay for the cost of their schooling. These government loans provide students with refunds at the end

of the academic year. However, to receive the money that is not paid to the PoN, the student must prove that he or she is in fact pursuing their education at the PoN. Thus the student must wait until the end of the academic year in order to receive this refund. Our focus group findings indicate that many of the first year students use this money to purchase laptops and/or smartphones, which helps explain the large jump in laptop ownership from first to second year.

4.3.2 Uses of Mobile Technology

Our survey asked students to indicate how interested they would be in using a cell phone for educational purposes on a scale from 1 to 5, where five is very interested and one is not at all interested. The most common response was a 5, very interested, and the average was a 3.78 (see Figure 8 for the response results). These data suggest that many students are interested in using their cell phone for education. In this section, we will explore which features of E-learning garner this interest.

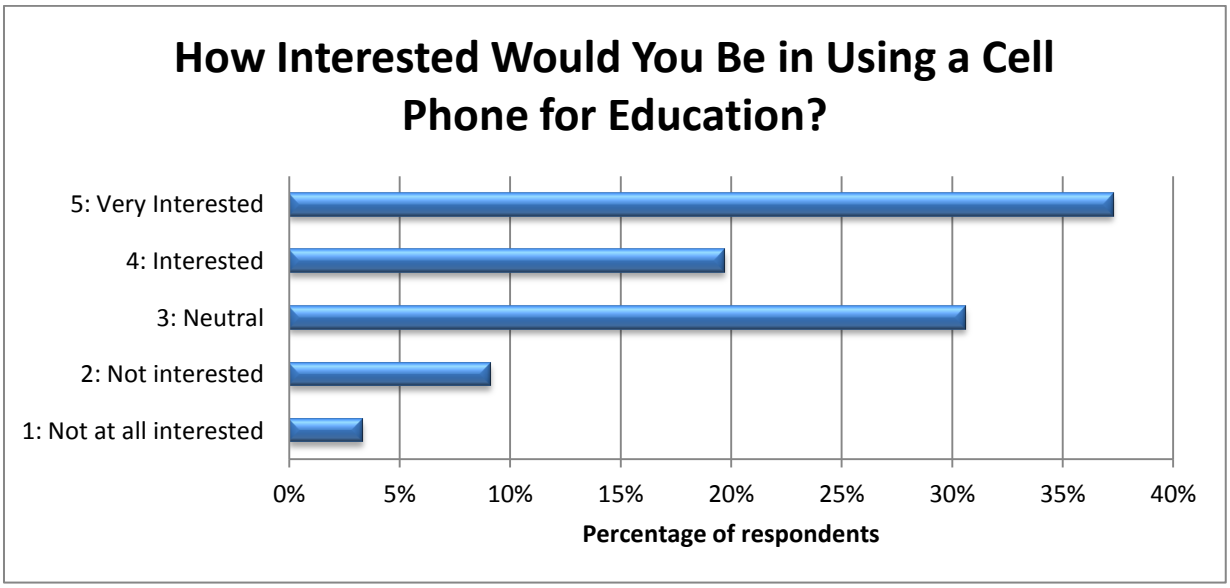

Figure 9: The results of question nine of the student survey (see Appendix B).

MyPoly has many different uses. We wanted to discover which of these uses students were most interested in accessing on their cell phones. When we asked what students currently used their phones for, we found 25% (86 of 338) of students were using their cell phone to read

materials posted by their lecturer, 29% (97 of 338) were using their cell phones to check their homework, and 34% (116 of 338) were using their phone to communicate with their lecturer (see Figure 9). However when we asked what tasks students wanted to do on their phones we found that 56% (190 of 338) of students wanted to use their phone to do research, and 59% (199 of 338) of students wanted to use their phone to access lecture notes (see figure 10). These results show a large difference in the number of students interested in using their cell phones for educational purposes and those that currently do. This can be seen when we examine the average response rate for each option in our survey. When asked what students were using their cell phones for, each option received an average of 30% response rate. When asked what students want to use their cell phones for, the average response rate for each option raised to 50%.

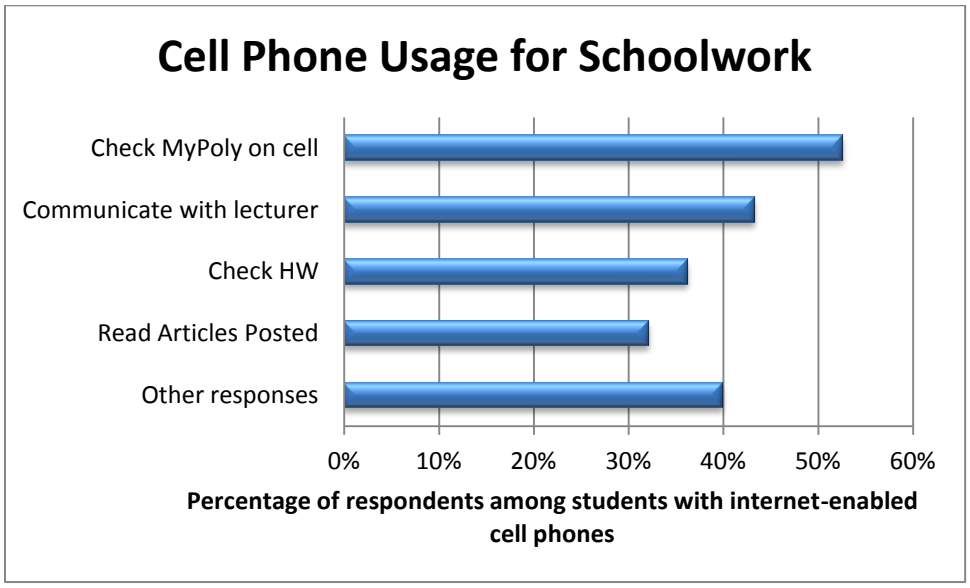

Figure 10: Results of question seven from the student survey (see Appendix B).

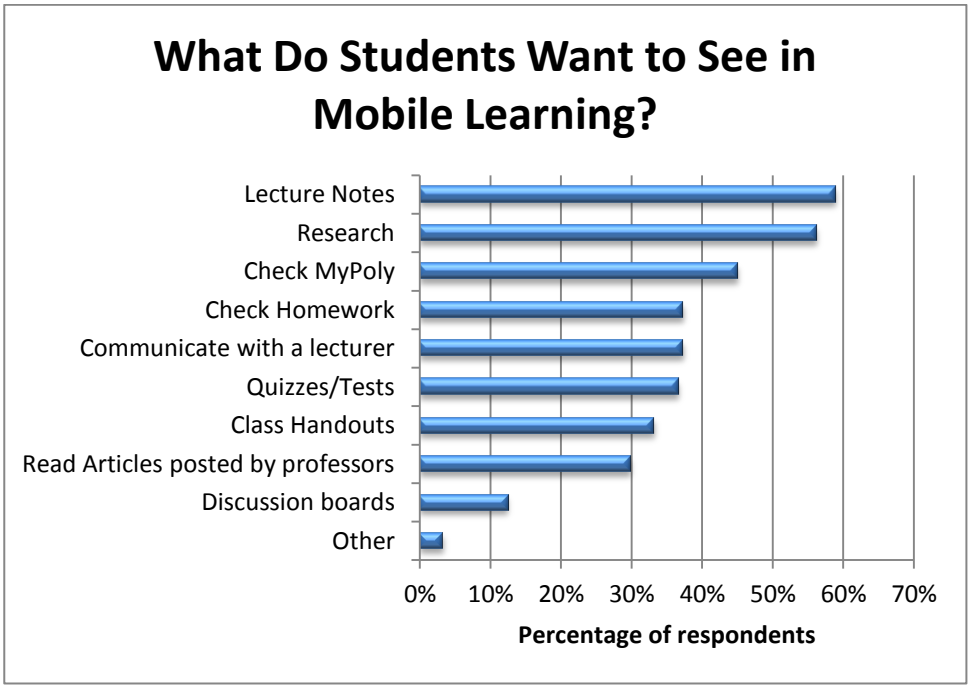

Figure 11: Results of question ten (see Appendix B).

Curiously, only 42 students reported they would like to see discussion boards in mobile learning, less than half as many as those who wanted to read articles posted by lecturers, which was the next least popular option. We suspect that many students did not know what a discussion board was and thus did not select it.

It should be noted that there were some inconsistencies in the data we collected. Forty-two percent (142 of 338) of students indicated that they use their cell phone to check MyPoly for announcements. However, this figure is potentially a high estimate of the true figure, since 25% (35 of 142) of these students also claimed they had not used MyPoly on their cell phone in the next question. This inconsistency suggests confusion among students caused by our survey questions. If we remove the inconsistent data, we still found that 35% (107 of 303) of students have used their cell phone to check MyPoly. We suspect that some students, in an effort to finish the survey quickly did not read the question carefully enough, resulting in inconsistent data. In addition, of the 34% (116 of 338) of students who reported they had used their phones to communicate with a lecturer, 24% (28 of 116) of these reported owning a cell phone that did not

have access to the Internet. We assume they referred to SMS or voice communications, which was not the intent of the question. Despite these inconsistencies, we are confident that students are eager to adopt these new technologies.

When we discussed using cell phones to read articles posted by lecturers in the focus groups, one student mentioned that his smartphone was slower than his laptop, which could explain the gap between the number of students using their cell phone for school and the number of students who say they want to use their phone for school. If resources fail to load quickly on their devices, students may simply avoid accessing them. Another explanation is the expense associated with using a cell phone to access the school resources. MTC is the predominant cell phone service provider for students, so on average, most students pay twenty-five Namibian cents to download one megabyte of data. Students explained that they did not want the added expense of using their cell phone to download files when they could just wait for a library computer to become available. A third factor is the "low reading culture" at the PoN, a phrase that refers to not reading more than is absolutely required.

We asked our focus group participants how the CTL could provide E-learning resources to students without an Internet-enabled device, a category representing 9% (30 of 338) of students. One student proposed sending SMS updates to students when the lecturer posted an announcement on MyPoly. Three students disagreed with the idea, saying that students need to be in charge of their own education. To wit: "To be a student, you must be diligent. You can't be spoon-fed the knowledge." On the opposing end, six students from the focus group were in favor of SMS updates from MyPoly. They mentioned issues with assignments changing without warning, leading them to either forget about an assignment or to rush the work to make the due date and thought that SMS updates would serve to mitigate these issues.

4.4 Tools for Increasing Usage of MyPoly and E-Portsocial

One of the key objectives of our project was to find ways to increase the use of the E-learning tools. The lack of student awareness of the E-learning tools at the PoN highlighted in section 4.1 presented an obstacle to the E-learning platform that we aimed to overcome. We found that new logos, flyers, posters, table sitting, presentations, and student involvement would be effective tools for promoting the use of the E-learning platform at the PoN. Collectively we refer to these tools as the awareness plan.

The first component of our awareness plan was the development of new logos for both E-Portsocial and MyPoly. The previous logos were not thematically connected, despite the fact that the CTL wants students to use the tools together. We established some guidelines for our logo designs: relate them to the PoN, use the PoN's official colors of blue and gold, and show that MyPoly and E-Portsocial can be used together. The new design is easily recognizable and fits all of the criteria given. The logos are thematically linked through the use the PoN's school colors and identical fonts. By rebranding both web tools, we hoped to increase awareness and user retention as well as show the tools could be used in tandem. The logos can be found in Appendix F.

Once we had new logos for the tools we created a series of promotional flyers and posters. The flyers, as seen in Appendices G and H, list the features of each tool we found were most popular among students. The flyers were distributed to students at our presentation and table sitting events. The posters (resized versions of the flyers) were placed in the library, lecture building, student kiosk, auditorium and bathrooms around campus. The showing of the posters and distribution of the flyers will help to increase the awareness of MyPoly, E-Portsocial.

We also made a mobile learning poster that is located in Appendix I. This poster provides information on the feasibility of using a variety of types of cell phones to complete various E-

learning tasks. The poster is set up in a grid fashion. If the entry for your phone and the task you want to complete is green, it means you can easily use your phone to perform the task. If the entry is yellow, there may be some sort of limitation associated with the completion of the task. If the entry is red, it will be difficult or not possible to complete the task on your phone. This poster will be placed outside of computer labs to inform students what work they can do on their phone while they wait for access to a computer.

To reach out to students directly, we set up a table near the student kiosk during the lunch break. We played music and gave away candy to attract students to our table. Once we had their attention, we explained that E-Portsocial was a new social network developed for them by the CTL. We compared it to other social networks, highlighting the educational and professional tools it provides. Students seemed most interested in the portfolio feature, where students can upload their best work from their time at the PoN and provide a link to potential employers showcasing their talents. Students were also excited to have unlimited access to E-Portsocial during the entire day, whereas other social networking sites like Facebook are only available at certain hours when using the PoN's Internet. After this explanation, we provided students with the chance to sign up for accounts on our computers. After we completed our table sitting, the CTL added an account for every student at the PoN. We believe that the students who made the effort to sign up for accounts during our event will become proactive members of this social network.

On April 17, 2013, we presented at the General Student Assembly to approximately 150 students, known to be among the most involved students on campus. After making a brief presentation on the capabilities of MyPoly, the educational benefits of E-Portsocial, and the mobile support for both of these tools, we answered questions from the students and informed them of the student groups we were forming. With this presentation we were able to dispel some common myths about MyPoly and E-Portsocial, enlighten students about the tools, and recruit

students for our student support groups. We hope that our presentation will promote discussion of E-learning among students, reaching those who may not have been able to attend the assembly.

One of the key benefits of MyPoly and E-Portsocial is that they can be continually updated. In light of this, we also established a student group that we called "Student Liaisons," consisting of eight students from the schools of Economics & Finance, Engineering, Humanities, Information Technology, and Natural Resources & Tourism. The eight students will serve as liaisons to the student body for the CTL. We look to the Student Liaisons to continue to utilize and develop the awareness plan we created after the completion of our project. We also created the group for the CTL's future use. Mr. Nkusi does not have many connections to students, so when the CTL needs to deliver updates to MyPoly or E-Portsocial, they will be able to use the Student Liaisons to test the new features and then communicate them to the student body. While the student liaisons will not communicate directly with the entire student body, they will be able to deliver updates to a wide group of students. The group was kept small at first with the idea that it can be expanded as needed.

4.5 Implemented Support Structures

There are two key characteristics of the E-learning platform that suggest the importance of establishing a strong support structure. First, significant changes have consistently been made to the E-learning platform over the past few years. Second, by July of 2013 the CTL plans to have every course offered at the PoN have a minimum web presence on MyPoly. In light of these findings, we knew that the support structures we developed would need to be adaptable to accommodate the changes to the tools, as well as scalable to support the expected large increase in users. We determined that an online signup form for workshops, a tutorial series and a student technical support group would be effective support structures for the PoN.

4.5.1 Online Signup Form for Workshops

To help facilitate the process of educating the lecturers, we created an online form that the lecturers can log into using their faculty number. Once logged in, the lecturer can view a list of available workshops and register for the ones in which they are interested. The lecturer can see a list of all the workshops for which he or she is currently signed up. The form also records data about the lecturers in a database, providing the CTL access to information about lecturers' attendance at certain workshops. This online form will expedite the process of educating the PoN's lecturers on MyPoly, which should translate to more classes using MyPoly and thus more students using MyPoly. The code used to create the form is located in Appendices J and K; a diagram depicting the database scheme is located in Appendix L.

4.5.2 Tutorial Series

When a lecturer decides to use MyPoly for a course, students enrolled in the course are often required to use it as well. With the CTL pushing for every class to be on MyPoly, it will be very important for students to be proficient with the tool. Video tutorials have been effective at educating the students on performing necessary tasks on MyPoly in the past, due in part to the relatively small amount of reading that needs to be done to receive the information. However, there are some issues with the medium. First, they are very difficult to update; when changes are made to the E-learning platform, video tutorials that were produced for the previous version of MyPoly become entirely obsolete. Additionally, tutorial videos cannot be tailored to the needs of every user. For users that require a lot of guidance, the videos will progress too quickly, requiring the user to rewatch the section or pause the video every few seconds. Conversely, for users that need very little help, the videos may go too slow, forcing the user to waste his or her time waiting for the video to progress through the topics they already understand.

To overcome these limitations we decided to use a program called Prezi, "a presentation tool that helps you organize and share your ideas" (Prezi, 2013). We decided on Prezi for multiple reasons. The first advantage of Prezi is its modularity. Each Prezi tutorial contains screenshots of the MyPoly website. If a section of the website changes, the pictures can be changed easily, as opposed to a video, which would need to be completely recreated. Secondly, Prezi allows us to create tutorials that progress at the proper pace. Prezi allows viewers to go at their own pace by only advancing once the user presses the "next" button. If a section is not understood, it can be repeated with a single click. A screenshot of one of the completed tutorials can be seen in figure 10 (we have included links to all of the completed tutorials in Appendix M).

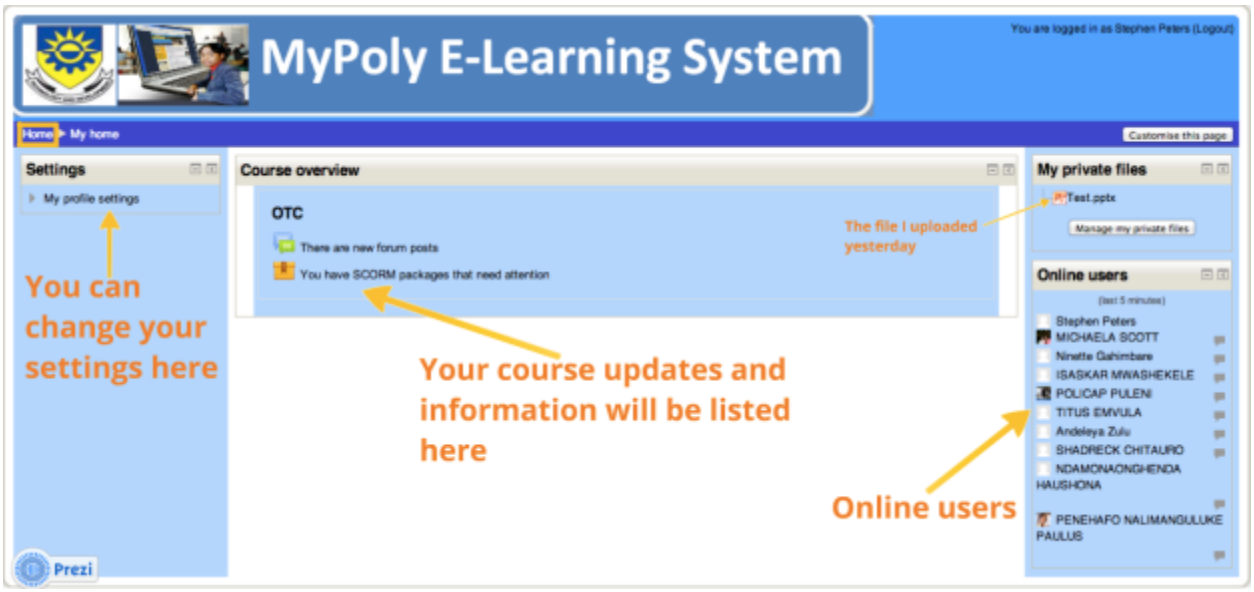

Figure 12: Sample screenshot of our MyPoly Tutorial Series.

We added a voiceover to the tutorials to make them more engaging and to better explain certain tasks. The narrator of the previous video tutorials spoke with an American accent, but we decided that a foreign accent could be difficult for viewers to follow. In addition, one of our concerns was modularity. By using the voice of someone who would remain at the CTL after we had left, changes could be made to individual voice clips should MyPoly ever be modified. We

chose Fortune to do the voiceovers for the tutorial series; she will continue to work with the CTL after we leave and will be able to modify any of the voice clips as necessary.

The run time of the completed tutorials averaged around two and a half minutes long. Originally, we did not include an indication that the voiceover for each step was complete, and thus that the viewer should go to the next slide. This dramatically increased the runtime of the tutorials as viewers would wait as much as ten seconds at each slide to see if there was anything else to be said. To remedy this problem, we added a short chime at the end of each voiceover clip to indicate that it was time to progress to the next slide. Additionally, we realized that displaying the tutorials could be problematic since the tutorials are hosted on Prezi's server, and during peak hours it took a very long time to load on the PoN's network. To address these problems, we recorded the Prezis as videos. Using a screen capture tool, we went through the tutorial, allowing the audio to play to completion and progressed to the end of the tutorial. While this feature would need to be updated if MyPoly ever changes, providing both the Prezi and video options seemed to be an acceptable way to increase the number of people able to follow the tutorials while still retaining the benefits of Prezi.

4.5.2 Student Tech Support

In the past, the members of the CTL have offered support services at the PoN. The CTL is primarily focused on working with the PoN's lecturers, but students often turn to the CTL when they are having problems with MyPoly. This face-to-face support is required for the effective implementation of E-learning as it is adaptable and comprehensive. Support materials, such as tutorial videos, cannot offer a solution to every problem. However, with the large amount of new users being added to the system, the CTL staff will no longer be able to fill this role. The CTL is a small group of dedicated individuals who are kept very busy with their current

obligations. To assist the CTL in supporting the students with the E-Learning platform, we created the “Student Tech Support” group.

The Student Tech Support group is comprised of five students proficient in the use of a computer. With training and practice, these students will become very knowledgeable of the features of MyPoly and E-Portsocial. These students will be available to the PoN community to answer questions from their peers as well as provide individualized support for those who need it. With some additional training on how to create courses on MyPoly, they could also assist lecturers with making more dynamic courses, which will provide a better experience for students. Once these students are trained, they will be able to recruit and train new members themselves should the group require expansion to accommodate the needs of more students.

4.6 Summary

The results presented in sections 4.1, 4.2, and 4.3 prompted the creation of the deliverables described in sections 4.4 and 4.5. In chapter five we will describe the recommendations we have for the CTL and PoN in light of these findings and deliverables.

Chapter 5: Conclusions and Recommendations

The goal of this project was to improve implementation of MyPoly and E-Portsocial at the PoN by raising awareness of these tools and identifying ways to improve mobile device accessibility. We achieved the following objectives: determine the level of awareness of MyPoly and E-Portsocial, determine which aspects of MyPoly are most beneficial to the students, determine the distribution and usage of mobile technology at the PoN, develop means of increasing the usage of both MyPoly and E-Portsocial, and implement support structures for effective use of these tools.

5.1 Conclusions

We found that many students had heard of MyPoly, but most students recognized it under the name ‘E-learning.’ However, very few students had heard of E-Portsocial, let alone used it. Thirty percent of students felt there were obstacles preventing their access to these online web tools. Students cited problems with Internet access and speed at the PoN in addition to their lecturers not posting course information to MyPoly. Despite a lack of awareness and these obstacles, students still showed excitement and eagerness to use these tools. These findings confirmed the need for a plan to increase the usage of both MyPoly and E-Portsocial.

MyPoly has many different features. We wanted to discover which of these features students were most interested in using. We found that the most popular features were downloading lecture notes, online assignments, and increased opportunities for communicating with their lecturer. These findings identify which aspects of MyPoly our awareness plan should emphasize.

We found that nearly all students own a cell phone, 80% of which have Internet capabilities. Additionally, 22% of students who own an Internet-enabled cell phone do not own a

laptop. However, there was a large difference in the number of students already using their cell phones for educational purposes and the number of students who expressed an interest in doing so. Our results revealed two possible explanations of their limited mobile access: cost of Internet access and speed of mobile devices.

In light of our findings, we created the awareness plan to increase usage of the tools. We designed simple, relatable, and thematically linked logos for MyPoly and E-Portsocial to emphasize that they complement each other. The posters and flyers we created showcase the MyPoly, E-Portsocial, and mobile learning features we found most popular among students. Table sitting and presentations allowed us to directly engage the student, instilling genuine interest in these tools. Finally, we established the Student Liaisons to act as the bridge between the CTL and the student body. These students will continue to promote the tools as they evolve using the awareness plan we developed.

We decided upon two support structures: a tutorial series and the Student Tech Support group. The series consisted of 15 individual tutorials each demonstrating a particular task in MyPoly. The program that we used to create the tutorials, Prezi, allows for easy modification. The Student Tech Support group is comprised of individuals knowledgeable in the functions of MyPoly and E-Portsocial and aims to support the PoN community in using these tools.

5.2 Recommendations

Based on our results, we have created a set of recommendations for the CTL to employ in order to ensure the success of their expanding E-learning program. These recommendations focus on all the different components of our findings including Internet access, lecturer utilization, E-learning education, mobile learning implementation, and support services

Recommendation 1: Improve access to the Internet on campus.

While part of the problem lies outside the PoN, the PoN should continue working with Telecom to increase the available bandwidth. Additionally, the PoN should look into the feasibility of increasing the number of routers on campus. There are several 'dead zones' on campus that could be revamped as wireless access points. Additionally, creating these new access points will reduce the strain on the already existing infrastructure.

Recommendation 2: Increase the number of lecturers using MyPoly.

With the stated goal of having an online presence for every course by June 2013, the CTL needs every lecturer to begin using MyPoly. This goal will require the CTL to have a close and supportive relationship with lecturers. To help in the transition, we recommend that the CTL continue to expand personalized training workshops with lecturers. These workshops are an effective way to promote the use of MyPoly with the added benefit of improving the quality of teaching. By personalizing these workshops, lecturers have an increased incentive to attend. Furthermore, they will be able to ask specific questions based on what features of MyPoly they want to use.

Recommendation 3: Teach the students to use the E-learning tools

Students need to use MyPoly for E-learning to become successful. We suggest that the tutorial series be shown during introductory courses, such as Computer User Skills. This would have a two-part benefit. First, it would give the lecturer a teaching topic by illustrating a necessary skill. Second, it would show the students how to use MyPoly, which will be used in their other classes. The series could also be shown in other courses or assigned as homework to further increase the students' knowledge of MyPoly and improve user skills.

While this will not cover every student, we also suggest that the tutorials be placed on the e-Poly homepage. In addition, we recommend that the first tutorial, which is titled *How to Navigate to the MyPoly Homepage* be placed on the PoN homepage. *How to Navigate to the MyPoly Homepage* is a guide on how to get to MyPoly from the homepage and is rendered ineffective if students need to navigate to MyPoly to watch it. Placing these tutorials on the e-Poly homepage will increase visibility of the tutorial series and make it more easily accessible to users.

Recommendation 4: Provide services to students without access to the Internet

While the number of students lacking access to Internet enabled devices is less than 10% of the total number of students, they should not be shut out from E-learning. Our first proposed solution for providing E-learning accessibility to these students is the creation of a MyPoly SMS program. The students who opt into this program can receive SMS alerts when their lecturers post updates and course materials on MyPoly Since there are concerns about the cost of the program, we also propose that a trial run of this program be introduced in a first year course. Since we found that first year students are the least likely to have Internet-capable devices, they are the primary audience for this tool. In addition, this trial run would determine the cost to the PoN and what should be charged for the service.

The other solution to students without Internet-enabled devices is to start a laptop or tablet rental program. Students would be able to borrow or rent a laptop or tablet directly from the PoN, which would allow students to access e-learning tools. This program would require careful management and a dedicated support structure. Again, we propose starting a trial program with a first year class. Running a trial program will allow the PoN to determine any issues and drawbacks in the rental program. This solution would have a direct impact on the use of E-Learning at the PoN by increasing the number of students able to access MyPoly and E-Portsocial.

We believe the SMS alert system to pose the lowest financial risk. The initial cost of setting up the SMS system is much lower than the cost of purchasing a supply of laptops or tablets large enough to service the students who have the need. Although this option would be more financially feasible, the capabilities of SMS are quite limited. For this reason, we consider the laptop or tablet rental system to be an effective solution. Students that don't have their own personal computer , especially first year students, will still be able to access all of the features of MyPoly and E-Portsocial if they have the option of renting a laptop.

Recommendation 5: Develop the support structure for students and lecturers

With the number of courses on MyPoly increasing at such a rapid rate, the number of students and lecturers who will require aid when using the software will grow. To service the needs of these individuals, we suggest that the CTL continue to train and expand the student tech support and student liaison groups as necessary.

5.3 Further Research

In this section we will discuss possibilities for further research. The first would be to identify ways to use mobile technology more effectively. Currently, students use their phones as a direct replacement for a computer. However, we do not know what other uses of mobile technology in education may be beneficial to the PoN. By researching the possible options, the CTL could improve the quality of education at the PoN.

A second possibility would be to determine the level of technology proficiency among students. While we have created a tutorial series to teach the students how to use MyPoly, we do not know the level of proficiency of students. Research into determining this will illustrate areas of necessary improvement for the PoN. For example, do students need more direct education

with regards to MyPoly and E-Portsocial or are the tutorials sufficient? The answer to this question will determine the future plan for student E-Learning education at the PoN.

Finally, after our proposed changes are implemented, will there be an increase in usage of MyPoly and E-Portsocial? This question is of particular interest when considering E-Portsocial. It would be helpful to know if more students are using E-Portsocial and if so, for what tasks. By determining what tasks are most popular on E-Portsocial, the CTL could identify areas for improvement on E-Portsocial and further develop these features

5.4 Final Thoughts

The CTL strives to provide an E-learning platform that is seamlessly integrated into the educational curriculum of every PoN student. Our efforts have produced an awareness plan and a support system for the CTL to assist them in achieving their goals. The awareness plan will serve to increase the number of students who know of tools of the E-learning platform as well as educate them on the capabilities of those tools. The support system will ensure that students who want to use the E-learning platform have the means of educating themselves. With access to the awareness plan and support system, the CTL is prepared to deliver an effective E-learning platform to the students of the Polytechnic of Namibia.

References

Albee, T., Hagger, J., Paula, A., & Perez-Rogers, J. (2012). *Opportunities for a New Generation of E-learning: The Return of Moodle to the Polytechnic of Namibia*. (Undergraduate Interactive Qualifying Project No. E-Project- 050812-134722). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-050812-134722/

Bartlett-Bragg, A. (2009). Reframing Practice: creating social learning networks. *Development and Learning in Organizations*, *23*(4), 16-20.

Bentley, Y., Selassie, H., & Shegunshi, A. (2012). Design and Evaluation of Student-Focused eLearning. *Electronic Journal of E-learning, 10*, 1-12.

Bloom, D. E., Kremer, M. R., & Sperling, G. B. (2007). Education in the Developing World. *Bulletin of the American Academy of Arts and Sciences*, *60*(4), 13-22.

Brooks, S., Ketterer, T., Price, R., & Rayworth, K. M. (2011). *Enhancing E-learning at the Polytechnic of Namibia*. (Undergraduate Interactive Qualifying Project No. E-Project-050411-090607). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-050411-090607/

Carr-Chellman, A.A. (Ed.). (2005). *Global perspectives on E-learning. Rhetoric and reality*. Thousand Oaks, CA: SAGE.

Cole, J., & Foster, H. (2007). *Using Moodle: Teaching with the Popular Open Source Course Management System.* Sebastopol, CA: O'Reilly Media, Inc.

De Agostini, G. (2010). Totally "Online" High School for People at Educational Risk. *Field Actions Science Reports, 4*. Retrieved from http://factsreports.revues.org/376

Ghaemi, H. (2011). The Utilization of Web-Based Technology as Predictor of Faculty Insights of Support for the Implementation of ELearning. *Turkish Online Journal of Distance*

Education, 12(Jan.), 54-61.

Government of Namibia. (1992). *University of Namibia Act*. (Act 18.1992). Windhoek, Namibia: Government Gazetteer.

Government of Namibia. (1994). *Polytechnic of Namibia Act* (Act 33.1994). Windhoek, Namibia: Government Gazette.

Greenhow, C. (2011). Online Social Networks and learning. *On the Horizon 19*(1), 4-12.

The College of the Holy Cross. (2013). Moodle-General Information. Retrieved February 5, 2013 from http://academics.holycross.edu/files/edtech/general_information.pdf.

Hrastinski, S., & Aghaee, N. (2012). How are campus students using social media to support their studies? An explorative interview study. *Education and Information Technologies, 17*(4), 451-464.

Hu, P. J.-H., Clark, T. H. K., & Ma, W. W. (2003). Examining technology acceptance by school teachers: a longitudinal study. *Information & management, 41*(2), 227-241.

Indian Institute of Technology. (2010). Educational Technology Services Centre, IIT Delhi. Retrieved February 19, 2013 from http://etsc.iitd.ac.in/index.html

Kallaway, P. (Ed). (2002). *The History of Education Under Apartheid, 1948-1994: The Doors of Learning and Culture Shall be Opened.* Cape Town, South Africa: Pearson Education South Africa.

Leporini, B. & Buzzi M. (2010). *Universal Access in Human-Computer Interaction.* Beijing, China: Springer Berlin Heidelberg.

Malik, K. (2012). Inception to Dissolution: E-learning Initiative at an Indian Institute. *Journal of Cases on Information Technology, 14*(3), 35-56.

Mbukusa, N. R. (2009). *Barriers to Remote Rural Students' Access of Distance Education Support Services Offered by the Centre for External Studies at the University of Namibia*. Retrieved from

http://uir.unisa.ac.za/bitstream/handle/10500/3465/thesis_%20mbukusa_n.pdf?sequence=1

Meyer, H. (2002). Education Partnerships and Democratic Education in Namibia. *Africa Today, 49*(*4)*, 113-131.

Nabeth, T. (2009). Social web and identity: a likely encounter. *Identity in the Information Society, 2*(1), 1-5.

PBS. (2001). Evolving Classroom. Retrieved January 31, 2013 from http://www.pbs.org/kcet/publicschool/evolving_classroom/index.html.

Polytechnic of Namibia. (2010). *The Polytechnic of Namibia Annual Report 2010*. Windhoek Namibia: The Polytechnic of Namibia.

Polytechnic of Namibia. (2012). 2012 Enrolment Report. Retrieved from http://statistics.polytechnic.edu.na/MIIRfiles/Enrolments/Erolment%20Report%202012.pdf.

Polytechnic of Namibia. (2013a) Administration. Retrieved from http://www.polytechnic.edu.na/administration/admin.php

Polytechnic of Namibia. (2013b). Centre for Open and Lifelong Learning (COLL). Retrieved from http://www.polytechnic.edu.na/centres/coll/coll.php

Polytechnic of Namibia. (2013c). CTL- Centres. Retrieved from http://www.polytechnic.edu.na/centres/ctl/ctl.php

Polytechnic of Namibia. (2013d). Historical Perspective. Retrieved from http://www.polytechnic.edu.na/about_us/history.php

Powell, A., & Patrick, S. (2006). An International Perspective of K-12 Online Learning: A Summary of the 2006 NACOL International E-learning Survey. Retrieved from http://www.eric.ed.gov/PDFS/ED514433.pdf.

Ranking Web of Universities. (2012). Sub-Saharan Africa. Retrieved February 14, 2013 from

http://www.webometrics.info/en/Ranking_africa/Sub_saharan_Africa

Sakamoto, T. (2002). E-learning and Educational Innovation in Higher Education in Japan. *Education Media International, 39*(1), 9-16.

Wali, E., Winters, N., & Oliver, M. (2008). Maintaining, Changing and Crossing Contexts: An Activity Theoretic Reinterpretation of Mobile Learning. *Journal of the Association for Learning Technology, 16*(1), 41-57.

Appendices

Appendix A: Sponsor Description

The Polytechnic of Namibia is one of Namibia's premiere universities with a storied history, giving the students and faculty great pride in this institution (Ranking Web of Universities, 2012). The Polytechnic grew out of the Academy for Tertiary Education, founded in 1980 (PoN, 2013d). Only four years after independence in 1994, the PoN was established by Act 33, which merged Technikon Namibia and the College for Out-of-School Training to form an institution that aimed to "provide post-secondary career-education with due regard for the human resource requirements of Namibia and with emphasis upon excellence in teaching within a climate conducive to the intellectual, social, aesthetic, and emotional development of students" (Government of Namibia, 1994, p. 2). Over the following nineteen years, the Polytechnic of Namibia (2013b) expanded to incorporate new educational technologies such as E-learning and distance learning.

The PoN is a public institution that receives about fifty percent of its income from subsidies provided by the Namibian government and about 35% from tuition paid by the students (PoN, 2010). The PoN (2013a) has 672 full time employees who are led by Rector Tjama Tjivikua. The institution is comprised of seven different schools: Business & Management, Humanities, Engineering, Health & Applied Science, Information Technology, and Natural Resources & Tourism. The Centre for Teaching and Learning, one of the seven Centres of Excellence, is the sponsoring organization at the Polytechnic of Namibia where we will complete our project. The PoN's organizational chart (Figures A1, A2, A3) gives a full picture of the organization of the different schools, their Deans and the Heads of Department, respectively, created from data pulled of the PoN website (PoN, 2013a). While nearly 700 employees may

seem like a large staff, the Polytechnic of Namibia (2013c) faces understaffing; for example, there are only four staff members working in the CTL.

The Centre for Teaching and Learning at the PoN (2013c) provides expert support to the university's faculty as well as access to various tools designed to improve the quality of teaching at the university. The CTL is a Centre within the PoN that receives its funding from the university. The CTL publicly displays their mission statement and vision:

> *To facilitate the creation and sustenance of excellence in teaching and learning at the Polytechnic through support to faculty and students [and] to enhance the teaching and learning competencies of faculty and students through the use of innovative methodologies and technologies that ensure success for all* (PoN, , 2013c, para. 2).

Due to a two-fold increase of student enrollment in just five years at the PoN (2012), it seems likely that the CTL's services are becoming more and more vital to the university's sustainability.

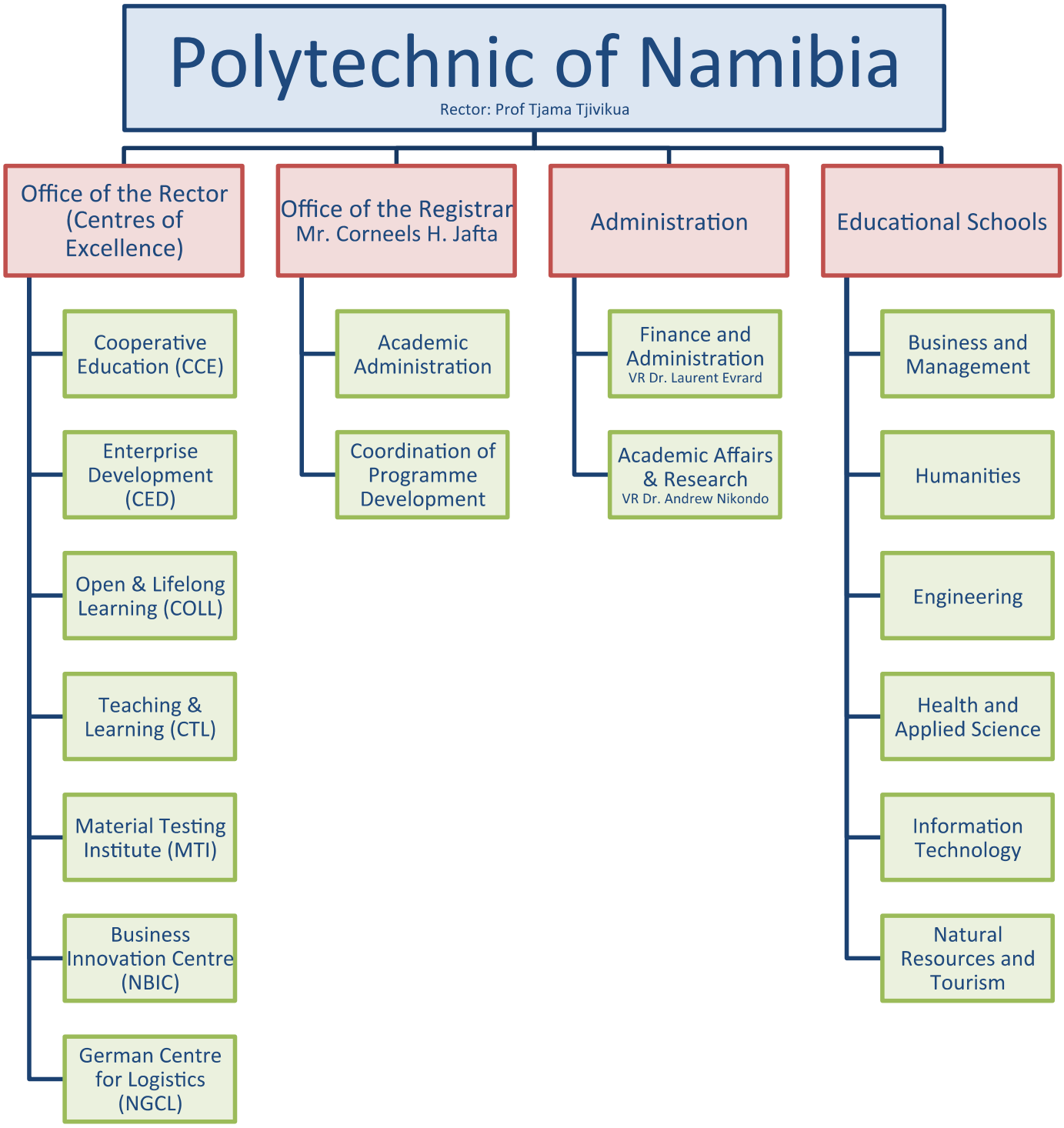

Figure 13: PoN Organizational Structure.

[Figure generated by the Author with information from the PoN (PoN, 2013a)].

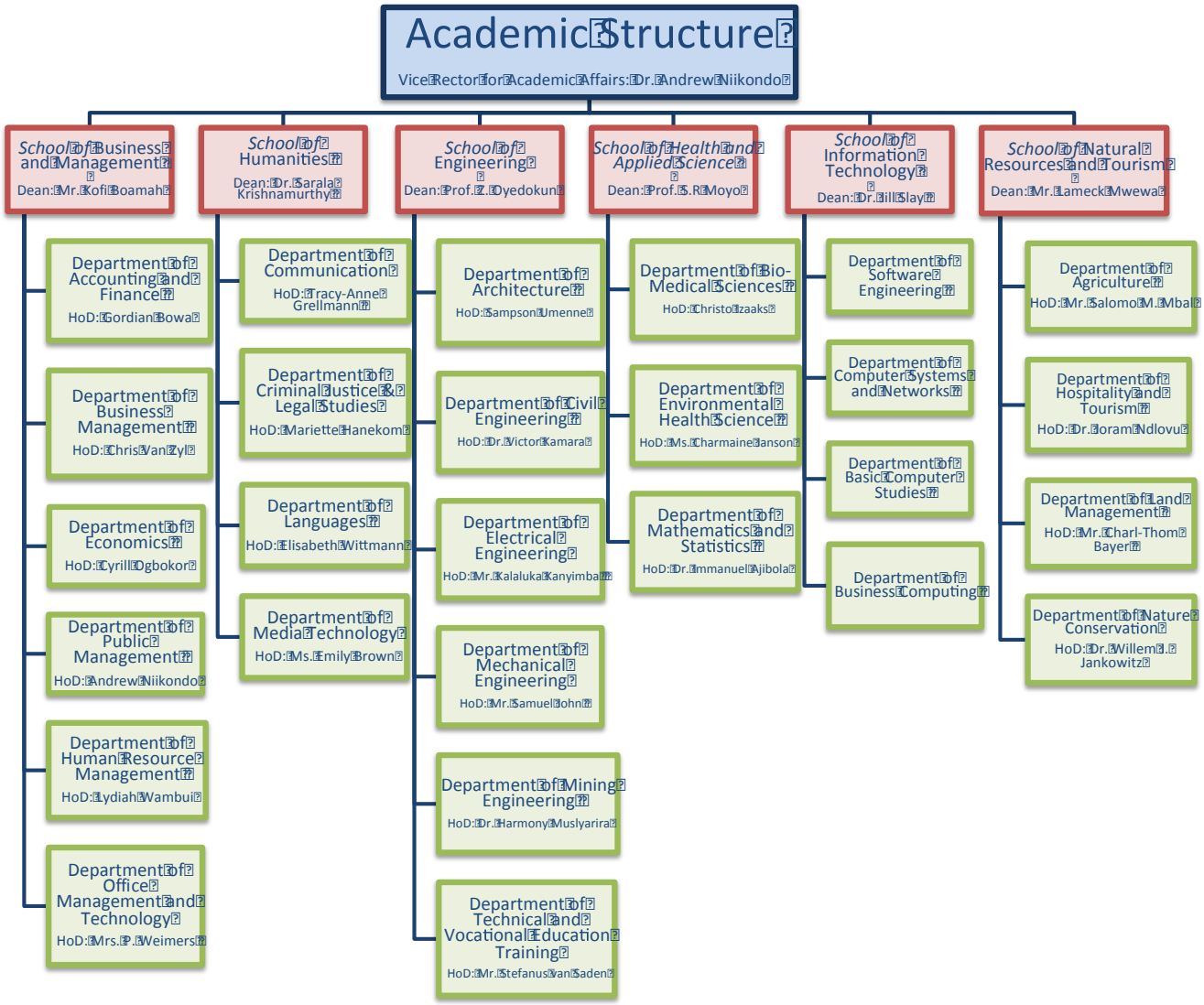

Figure 14: PoN Department Organization.

[Figure generated by author with information from the PoN (PoN, 2013a).]

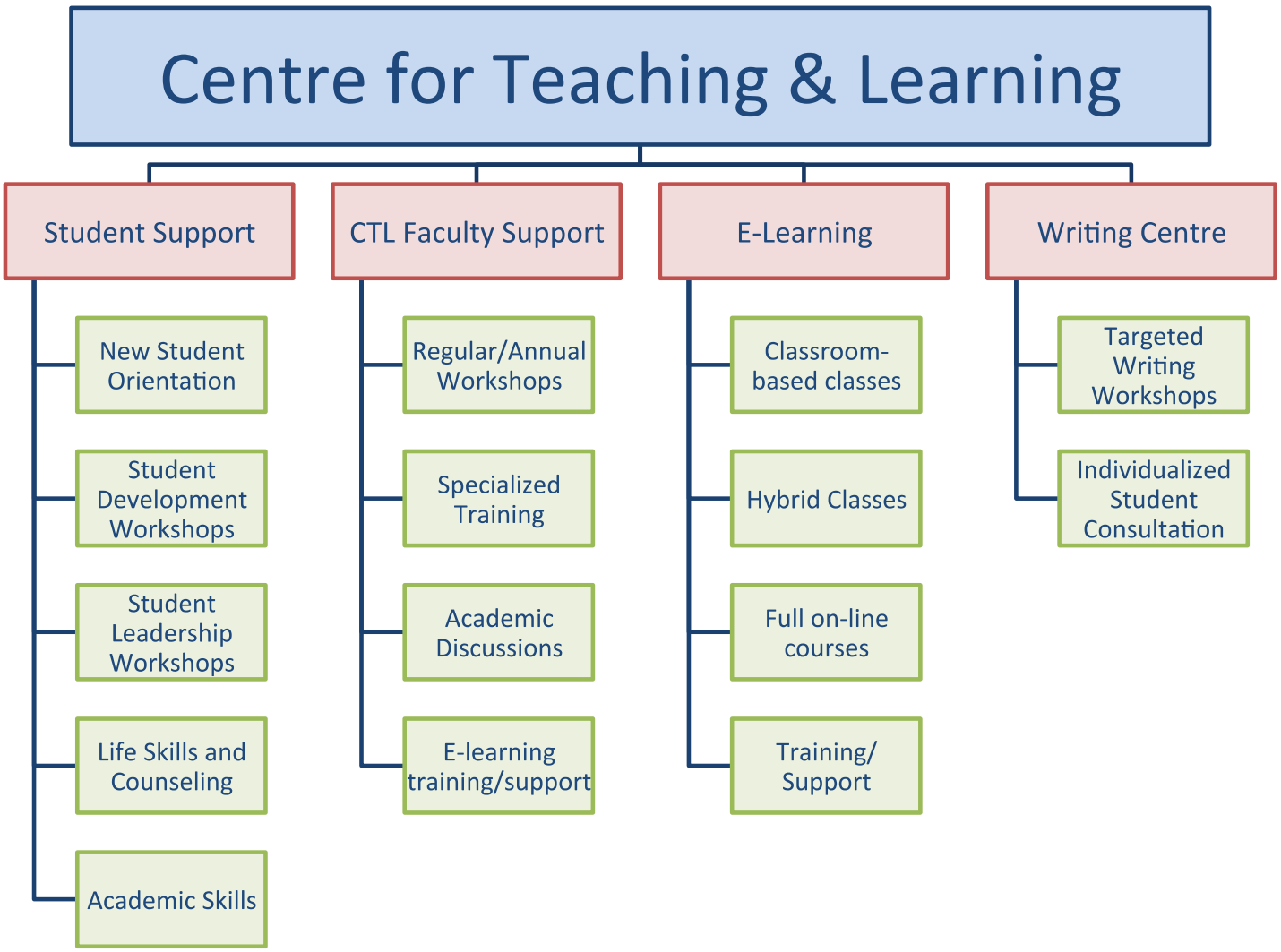

Figure 15: PoN CTL Organization.

[Generated by author with information from the PoN website (PoN, 2013c)]

Appendix B: Student Survey

E-learning Survey

This is an anonymous survey; you will not be tied to your response in any way.

We are a group of U.S. students from Worcester Polytechnic Institute conducting research for the Polytechnic of Namibia's Centre for Teaching and Learning.
This survey will be used to collect information about mobile learning and will help us improve the PoN's E-learning platform.

Thank you very much for agreeing to take our survey.

1) What year are you at the Poly?
   ☐1st year ☐2nd year ☐3rd year ☐4th year ☐Other

2) What is your course of study?

3) Do you own a laptop?
   ☐Yes ☐No

4) Do you own a cell-phone?
   ☐Yes ☐No

   5) If so what provider do you use?
      ☐MTC ☐Leo ☐Telecom-Mobile ☐Other

   6) Does your cell-phone have Internet access?
      ☐Yes ☐No ☐Unsure

   7) Have you used your phone to do schoolwork? Check all that apply.
      - ☐ Read articles posted by lecturer
      - ☐ Communicate with a lecturer
      - ☐ Check homework
      - ☐ Check MyPoly (E-learning) for class announcements
      - ☐ Other (please specify): _____

   8) Have you used MyPoly (E-learning) on your cell phone?
      ☐Yes ☐No ☐I've never used MyPoly at all

9) On a scale from one to five (where five is very interested and one is not at all interested), how interested would you be in using a cell phone for education? Circle the appropriate number.

   1 2 3 4 5

10) What functions of mobile learning (using a cell phone or other mobile device) would you find beneficial? Please check all that apply.
   - ☐ Read articles posted by professors
   - ☐ Research
   - ☐ Communicate with a lecturer
   - ☐ Discussion boards
   - ☐ Check homework
   - ☐ Quizzes/Tests
   - ☐ Lecture notes
   - ☐ Class handouts
   - ☐ Check MyPoly (E-learning) for class announcements
   - ☐ Other (please specify): _____

11) Where do you go for Internet access?
   - ☐ At home
   - ☐ Off campus location (coffee shop, town library)
   - ☐ On campus (please specify): _____
   - ☐ Other (please specify): _____

12) Have you ever used social media (Facebook, Twitter, etc.) for your schoolwork?
   ☐ Yes ☐No

   If so, for what? _____

12) Have you ever heard of E-Portsocial (Education for Sustainable Development)?
   ☐ Yes ☐No

   If so, from where? _____

MyPoly and E-Portsocial provide online access to:
- homework assignments & quizzes
- discussion boards
- lecture notes
- collaboration outside of the classroom.

13) Would you be willing to use these tools for your education?
   ☐ Yes ☐No

14) Is there anything preventing you from using these tools?
   ☐ Yes ☐No

   If so, what? _____

Appendix C: Focus Group Protocol

The focus group will be run by one of our group members who will be responsible for facilitation. He or she will establish guidelines for contribution as well as maintain productive discussion among all members of the group. Another member of our group will be responsible for taking extensive notes. The protocol for the focus group is shown below.

Moderator:

> Hello. My name is [Moderator]. [Introduce the note taker briefly.] Thank you all in advance for your time. We are students from Massachusetts working with the Centre for Teaching and Learning on a project researching the impact of E-learning technology on this campus. We will also be interviewing various professors and administrators to get their opinions. We hope that we can get your opinions and views on E-learning today. If you have any questions, please feel free to ask now. [Answer any questions.] To start, let's go around the circle and introduce ourselves. What is your name, major, and one of your favorite hobbies? [Go to the left.]

Questions to be answered:

1) What do you know about E-learning?
2) What experience do you have with Chisimba?
3) What experience do you have with Moodle? Have you used it more than Chisimba?
4) How is Moodle used by your professors? How often is Moodle used by your professors?
5) What features of Moodle have you used for classes?
6) What features do you like about Moodle?
7) What features do you dislike about Moodle?

8) How do you use social networking, such as Facebook?
9) Have you heard of E-Portsocial? What do you know about it?
10) How would you use social media to improve education?
11) If you were to use a social network for a class, what would you expect to do? What would you like to do?
12) How often do you use a phone to search for educational materials?
13) How often do you use a computer to search for educational materials?

As a note, the emphasis for these focus groups is not necessarily to answer each question in order. Ideally, the students will take over and begin chaining ideas and thoughts together. The moderator will keep discussions on the topics of Moodle and social networking/media. At the end of the interview:

> I would like to thank all of you again. Your feedback and participation is greatly appreciated. If you have questions or concerns, we can be reached at [give our contact information]. You will hear from us again within two weeks. We will summarize today's session and submit our notes to all of you for review to ensure that we didn't miss anything or misinterpret your words. It was a pleasure to meet all of you and have a nice day. Thank you again.

Appendix D: Survey Results

Question 1: What year are you at the Poly?		
	Survey Responses	
First Year	78	23.1%
Second Year	130	38.5%
Third Year	89	26.3%
Fourth Year	35	10.4%

Table 1: Survey Responses by Year

Question 2: What is your course of Study?		
Sorted by Major		
Major	*School*	*Number of Responses*
Business Administration	Management	38
Economics	Economics and Finance	38
Agriculture	Natural Resources and Tourism	34
Engineering	Engineering	34
Accounting and Finance	Economics and Finance	30
Information Technology	Information Technology	26
Human Resources Management	Management	20
Public Management	Management	20
Marketing	Economics and Finance	14
Logistics and Supply Chain Management	Management	13
Office Management	Management	10
Mathematics and Statistics	Health and Applied Sciences	9
Regional Rural Development	Natural Resources and Tourism	7
Geomatics	Natural Resources and Tourism	5
Land Administration	Natural Resources and Tourism	5
Tourism Management	Natural Resources and Tourism	4
Communications	Humanities	3
Entrepreneurship	Management	3
Environmental Health Sciences	Health and Applied Sciences	2
Lot	Other	1
Metallurgy	Other	1
Pre-Hospital Emergency Medical Care	Health and Applied Sciences	1
Property Studies	Natural Resources and Tourism	1
Transport Management	Management	1
Unspecified	Unspecified	18

Table 2: Surveyed Students by Course of Study.

Responses Sorted by School	
School	*Number of Responses*
Management	105
Economics and Finance	82
Natural Resources and Tourism	56
Engineering	34
Information Technology	26
Health and Applied Sciences	12
Humanities	3
Unspecified/Other	20

Table 3: Responses by School

Questions 3, 4, and 6	
Question 3: Do you own a laptop?	
Yes	230
No	108
Question 4: Do you own a cell-phone?	
Yes	336
No	2
Question 6: Does your cell-phone have Internet access?	
Yes	268
No	70
Unsure	0

Table 4: Ownership Statistics of Internet-Enabled Devices

Breakdown of Years versus Internet-enabled devices				
Year of Study	*Own a Laptop*	*Do not own a Laptop*	*Own a cell phone with Internet access*	*Do not own a cell phone with Internet access*
First Year	37	41	59	19
Second Year	92	38	98	32
Third Year	71	18	78	11
Fourth Year	28	7	29	6

Table 5: Ownership of Internet-Enabled Devices versus Year of Study

Breakdown of Years versus Internet-enabled Devices									
Year of Study	*Own a laptop and cell phone with Internet access*		*Own a laptop, but not a cell phone with Internet access*		*Own a cell phone with Internet access but not a laptop*		*Do not own either a cell phone with Internet access or a laptop*		*Total Students*
First Year	32	41.0%	5	6.41%	27	34.6%	14	17.9%	78
Second Year	73	56.2%	19	14.6%	25	19.2%	13	10.0%	130
Third Year	61	68.5%	10	11.2%	17	19.1%	1	1.12%	89
Fourth Year	24	68.6%	4	11.4%	5	14.3%	2	5.71%	35
Total	190	57.2%	38	11.4%	74	22.3%	30	9.04%	332

Table 6: Ownership of Cell Phones and Laptops by Year of Study

Breakdown of majors versus Internet-enabled devices					
Major	*Laptop and Cell*	*Cell without Laptop*	*Laptop without Cell*	*Neither Cell or Laptop*	*Total Number of students*
Accounting	18	7	4	1	30
Engineering	23	1	7	3	34
Business	20	12	3	3	38
Entrepreneur	0	2	1	0	3
Environmental Health	0	1	0	1	2
Office Management	2	5	0	3	26
IT	18	4	1	3	10
Economics	25	7	3	3	38
Marketing	9	4	1	0	14
Logistics	7	3	1	2	13
Mathematics/Statistics	6	1	2	0	9
Regional Development	1	4	0	2	7
Geomatics	3	0	0	1	4
Public Management	17	5	4	2	28
Human Resources	11	8	0	1	20
Land Administration	3	1	0	1	5
Tourism	3	1	0	0	4
Property Management	0	1	0	0	1
Transport	0	0	1	0	1
Metallurgy	1	0	0	0	1
Communications	3	0	0	0	3
Pre-Hospital Emergency	0	0	0	1	1
Totals	190	74	38	30	332

Table 7: Ownership of Cell Phones and Laptops by Course of Study

Question 7: Have you used your phone to do schoolwork?	
Response	*Number of Responses*
Read Articles posted by Lecturer	86
Communicate with lecturer	116
Check homework	97
Check MyPoly on Cell	141
Search Internet	30
Exam Results	12
Research	10
E-mail	8
Do assignments	8
Facebook/social networking	6
Check academic progress at Kiosk	6
Notes	5
Download old exams	4
Study	3
Communicate with peers	3
Timetable	2
SMS	2
Library Service	2
Asking for help	2
Vocabularies	1
Page too large	1
Nexus	1
PowerPoint	1

Table 8: Phone Usage for Schoolwork

Interest in MyPoly on a Mobile Phone			
	Own a cell phone without Internet	*Have Used MyPoly on a Mobile Phone before*	*Have Not Used MyPoly on a Mobile Phone before*
Response 1	1	3	8
Response 2	5	14	16
Response 3	17	41	29
Response 4	14	28	37
Response 5	30	47	76

Table 9: Interest in MyPoly on a Cell Phone

Question 10: What functions of mobile learning would you find beneficial?	
Response	*Number of responses*
Read articles posted by professors	101
Research	190
Communicate with lecturer	126
Discussion boards	42
Check homework	126
Take Quizzes or Tests	124
Lecture Notes	199
Class Handouts	112
Check MyPoly	152
Check academic progress	4
Study	2
Read Books	1
Financial Progress	1
Download notes	1
Use search engines	1
Watch videos	1

Table 10: Desired Mobile Learning Functions

Question 11: Where do you go for Internet access?	
Location	*Number of responses*
At home	118
Off campus	24
On campus	265

Table 11: Internet Access Locations for Students

Question 12 (a and b)	
Question 12a: Have you ever used Social Media for your schoolwork?	
Yes	135
No	203
Response (If so, for what?)	*Number of Responses*
Communication/Chatting	23
Socialization	15
Asking for help	12
Research	12
Questions	9
Company Law	5
Discuss Schoolwork	4
Group Discussion	3
Fun	3
Opinions	2
Essay	2
Marks	2
Advertising	1
Make comments	1
Connecting with professionals	1
Tutors	1
News	1
Studying	1
Solve for math	1
Engineering Group	1
Feedback	1
Updates	1
Internet Identity	1
Lecturer	1
Friends	1
Announcements	1
Blank	19
Question 12b: Have you ever heard of E-Portsocial?	
Yes	14
No	324
Response (If so, from where?)	*Number of Responses*
Orientation/Presentation	3
Internet	3
Forum	1
Classmates	1
Lecturer	1
Friends	1
School	1
US Exchange Students	1

Table 12: Social Media at the PoN

Question 13 and 14	
Question 13: Would you be willing to use E-Portsocial and MyPoly for Education?	
Yes	321
No	17
Question 14: Is there anything preventing you from using these tools?	
Reason Given	*Number of responses*
Nothing Preventing Me	238
Something Preventing Me	100
Internet-related issue	62
Knowledge of these tools	15
No access to a laptop	18
Monetary Concerns	9
No phone	8
Library overcrowding	5
Do not know how to use the tools	2
Difficult to use	2
Blocked during the day	2
Transportation arrives at 4 PM	1
Surf	1
Fulltime Student	1
Unable to print	1

Table 13: Obstacles to E-Learning Use

Appendix E.1: Notes from Focus Group 1

This focus group took place on March 18, 2013 at noon. There were 9 students in attendance.

- What do you know about E-learning?
  - You can find assignments, do tests, have discussions etc.
  - Can use it anywhere in the country
    - It's very convenient
    - No need to travel
  - Can post videos from class
  - You can submit assignments
  - 3rd Year Student: Found out about E-learning recently – Feels behind
    - Professor posted notes online before class
    - Students would then discuss notes in class
    - Was confused as to how to use it at first
  - What people like about E-learning
    - Don't have to buy any materials, can just find it online
    - Can Submit the assignments from anywhere
      - As long as there is Internet available and if the subject is listed online
    - Can help students self-esteem being able to learn on their own outside of class
  - 4th year: only had two subjects that used E-learning
  - Find things online (e.g. forms), also group discussions
  - Lecturers post videos, see what happened in class
  - One student hadn't ever used it
- Do you have Internet access at home?
  - No, sometimes students don't even have computers at home

- Mostly working on campus (no computers off campus)
- Even on campus, there isn't a place to sit and use the Internet
- The infrastructure is not good

❖ Math department is not using E-learning

- E-learning is not for practical studies such as math where you need to learn the concepts.
- It's a different teaching style
- Other classes also don't have an E-presence

❖ How much have people used Chisimba?

- One English course
- "It was better than nothing"

❖ Is MyPoly being used on campus?

- No it hasn't really been used
  - Professors aren't using it
  - Some people have used the discussion boards though
- It's not well promoted around campus
- Low reading culture
  - Rather do own research on computers then read through text books
    - Textbooks are quite dull
  - Nice to have Information provided in different ways not just textbooks
    - Professors should post news articles

❖ What do you know about social media

- Students use Facebook
  - Can use to get updated on news – people post quickly about big events
  - Facebook and School should be kept separate

- If you needed to ask someone in another department a question, they would

- Studying for tests – Discussion boards help with remembering material
- Groups on Facebook not popularly used
  - One person used them for a Society at the PoN
- Seeing a story on Facebook means that people remember it better
  - Discussions stick in people's heads
  - Professors could follow the discussion and then could post the right answer
    - Right now, lecturers just leave class immediately after finishing lecture, giving no chance for discussion
- It's a way to expand your network

- Different way to present information
  - Possibly like a textbook with more information?

- E-Portsocial?
  - Haven't heard of it
    - One person had heard of it
    - Increase awareness for undergraduates
  - Can understand what students say better than professors
    - Collaboration leads to better work
  - Difficult to find access to computers all the time
  - "It would add more value to what we are already doing"
  - Be possible to pick up something new
  - The Portfolio feature
    - Students were excited about the concept

- E-Portsocial gives you a chance to find more classmates and then understand more material
  - "You just know this face"
  - Closest friends may not know enough either
- Not enough users right now though

❖ Mobile Phones

- Some students don't know what a cell-phone is
- Cheaper phones are more common
- People would use SMS for help in classes
- They do not have CUS (Computer User Skills)
- A lot of students have Text/call phones
- Not environment for cell phones
  - bad service
- What if you received announcements/ reminders?
  - It would not be annoying
  - Great to remind people of tests
  - Right now, if an assignment changes, there's no contact
- Lack of communications on campus with professors

❖ Library Comps

- Awful – can freeze for hours
  - Pay 9$N for a cab, get to the library, can't do anything, pay 9$N for another cab
  - Put more effort toward improving computer labs
- They are overcrowded as well
- More than ½ of students have laptops
  - But no one is really all that sure

- Some people got them from government loan (not true for everyone)
    - Some students sold laptops for instant cash
- Should advertise to use refund from Government to buy laptops and smartphones
- Can't survive without laptops on campus
    - First years tend to not have laptops
- Classes move too fast to type notes

❖ Government Loan Program

- PoN gives a refund/stipend/loan at the end of the year
- Second years can buy some things
- Government pays for books, so the book fund is the refund
- The problem was that students were flipping the laptops for quick cash

Appendix E.2: Notes from Focus Group 2

This focus group took place on March 19, 2013 at noon. There were 12 students in attendance.

- What do you know about E-learning?
  - Learn about it in class but don't use it (three students)
  - Used it this year – stopped – trouble logging in
  - Know capabilities
  - Networking – Prof and students
  - Can be used to post Announcements and notes
  - Some students don't see the benefit of using E-learning
  - One student didn't successfully make an account
- Have you ever heard of MyPoly
  - Sounds familiar to some students
  - Not familiar to most of the students
    - Around fifty-fifty split?
  - One student used it for ecology
  - Professor posted PowerPoint slides
    - Internet was too slow
    - Students were lucky if one person were able to download it
    - Students usually take a memory stick to the professor to get the notes
    - "If I go to lecture, why should I have to get the notes online as well?"
  - Professors need to take initiative
    - Students don't see the importance at the moment
    - "Lecturers are not marketing it enough to students"
    - "They don't push them enough towards it"

- Some students cant access MyPoly from home
  - One student thought that they had a different password at home than at school
- Posting videos of class on MyPoly
  - Some students think that a lot of people would not go to class if this was used
  - Why should we double the amount of work?
- Language and IT students do online papers and submissions
  - This is not done through MyPoly
- Why advertise to students when professors aren't using it?
  - Which students are the target?
    - Full time? Distance? Part time?
- Access to MyPoly needs to be improved
  - Questions on MyPoly remain unanswered

❖ Have you heard of E-Portsocial

- Student "What is that?"
- One student accidentally ran into it
  - Checked it out and talked to random students online
- It is well advertised on the Polytechnic Website
- Concept sounds cool but the Internet is too slow
- People seemed excited but also frustrated with the Internet

❖ What would you want out of E-Portsocial

- Video calling – allows students to talk about hw and projects easier
- Ability to ask professors about questions
- People liked the portfolio system
  - Populate your page with terms that companies are looking for
- It would eat into personal time

- Internet
  - Seit – only used by IT students
  - Other students must pay fines if caught using it
  - Some places have stronger Internet on campus than others
    - The ground floor of the office building has good Internet, but there's no space to sit
  - Slow Internet turns people off from doing anything
    - It's very frustrating to wait for five minutes to load one page
  - Need to get more routers in different buildings
- Cell-Phones
  - Would you get E-Portsocial on your phone?
    - Too expensive
  - What do you use your cell-phone for?
    - Text/call
    - Data on phones is slow
  - Would you like to receive announcements through SMS from Professors?
    - Would love it
    - Only distance students should have this option
    - Some students believe that your just lazy if you would like this, students already know these dates
      - "To be a student, you must be diligent. You can't be spoon-fed the knowledge."
    - Other Students believe:
      - I am still a human being and can still forget
    - Agreement:

- If professors upload online and make announcements then there is no need to sms updates on the phone

- "I would use E-learning on my phone if it was worth it and if the Internet were faster."

- Do students know the value of a laptop?
  - No it really depends on the major
  - Lap-Tops are not used to their full potential
    - Used for Movies, Facebook, etc.
- Better to post notes before or after class?
  - Currently professors post notes two days after class
    - No longer need to look at them until the midterm or final
    - If posted before classes can be more engaging,
      - This makes it much easier to remember material from class on exams

- Computer Issues
  - The library computers will take 7-8 minutes to print something
  - "Kind of slow"
  - 40% of computers have some sort of problem
  - "I don't really use my laptop"
  - First years tend not to have laptops
    - Some majors need laptops
  - Increase the number of computer labs

Appendix E.3: Notes from Focus Group 3

This focus group took place on March 20, 2013 at noon. There were six people in attendance.

- What do you know about E-learning?
  - Professor told us about it in class
  - One student learned the basics from an English professors
    - How to use online resources
- Have you ever heard of MyPoly
  - Seen it on the Polytechnic website
    - Don't know exactly what it is
  - Fourth year student uses it for Research (E-Journals)
    - Getting online articles and e-books
  - Heard about it last year but didn't get anything out of it – could not log on.
  - One student states: MyPoly is used for finding books in the Library
  - Chisimba – Is used to post notes
  - If professors use it then students will
  - Not very well advertised on campus
  - MyPoly is called E-learning on Campus
  - Some professors upload notes and discussions
    - English – upload more articles for practice
  - Direct feedback via MyPoly
  - If it is mandated students will use it
- What would you like to see in MyPoly?
  - Assignments and notes online
  - But professors aren't using it

- Do you guys use Facebook at all?
  - Most students have it (3 out of 4)
  - Use it to chat with friends and with groups
  - Also used to post pictures, and reconnect with students
  - Keep academics separate from Facebook
  - One professor used Facebook to make announcements
  - Do you guys use the group feature on Facebook?
    - Not for school purposes
- What do you guys think about social networking in Education?
  - "There's no spot for socializing"
  - Groups with sports teams would be useful
  - Allows students to have some fun and relax
- Internet
  - Internet is very slow
  - Patches of good Internet around campus
    - Spotty Internet makes it difficult to submit assignments
  - Takes a very long time to download anything
  - Professors are not accepting of certain Internet Websites
    - Certain sites are blocked to prevent students from using them to help with their assignments
    - Students then need to go off campus in order to use these sites
    - Example: Mat Lab
      - Education website blocked
      - Block websites without codes
    - Have to use own Internet on your phone to access certain material

- That can be very effort intensive
- Internet outside of the MyPoly is very expensive
- "We are students. We are always focusing on education"

- Most don't have Internet at home
  - If they want to have it most people must get NetMan
  - Bundles are a good deal though
- "Everybody needs to do something online"
- Rare to find someone who actually uses email consistently
  - Use email to establish other email accounts

❖ Cellular phones

- Texting and calling is very popular
- Would you prefer to access MyPoly on your phone?
  - Use to get Announcements? – Yes
- What do you look for?
  - Just to check assignments, but no downloading
  - Automatically updating eats up data quickly
- Internet rates are becoming more expensive
- "I don't see myself using MyPoly on my phone"
- "It's your responsibility to check MyPoly daily" ~ a professor

❖ Laptops

- 2nd 3rd and 4th year students have laptops
- First year students don't have/want laptops
- They "don't see the need"
- Laptops give students more freedom

- Student support network? What kind of incentives do we need?
  - Students like money
  - Having a name up on the PoN Website "doesn't do it for me"
  - More IT students than the general population
  - Will be difficult to find people
  - Clubs don't solicit, you have to know about them first
  - People like music a lot
    - Music may be an effective tool
  - Money is a more attractive reward
  - Talk to lecturers, they have the most influence
    - Right now, lecturers are brushing off E-learning
    - Possibly teach students how to use E-learning tools DURING Orientation

Appendix E.4: Notes from Focus Group 4

This focus group occurred on March 21, 2013. There were ten people in attendance.

This group seems (and is) older than the other three previous groups

- E-learning: What is it?
  - Heard the term, never used it
  - Seen it online, but not offered by the lecturers
  - One had used it, but not in depth
  - Used to have a class with videoconferencing
    - Liked the ability to rewind
  - Very busy, not enough time to explore
  - All about writing
- What do you know about MyPoly?
  - Saw it on the PoN website
  - No one had logged in to try it
  - Received password, but it doesn't work
  - One had lost their password
  - Logistics/Supply Chain has no e-presence (no MyPoly classes)
  - Very unfamiliar ground for this group
- After describing MyPoly, would you be interested in it?
  - General feeling that they like the idea
  - But most of them can't really use it, which is unfortunate
  - If it were offered, they would totally use it
  - Right now, lecturers are not using MyPoly and so the students can't either
    - The lecturers are overworked

- Is MyPoly offered across Namibia?
- There seems to be some confusion on what MyPoly is in the group
- Advantages of MyPoly
  - It would be nice to study from home
    - Working from 8 to 5 or 8 to 8 and then class leaves little time for any extra learning
    - People get home between 10:30 and 11
  - People leave immediately after class
  - E-learning would be super helpful
  - It's assistance to learning
    - Not replacing lecture, just supplementing it
- Internet Access?
  - About 70% have Internet access at home (very rough estimate)
  - "The wireless is not bad at all"
  - There are some hiccups
  - At times, the network is slow
    - According to the PoN, the problem is with Telecom
  - Internet access at work
    - But that's for work uses
  - Only weekends for access times
  - "If it's worth it, I could make sacrifices"
- Social Networking
  - Everyone in this group has a Facebook
  - Groups on Facebook are popular
  - IT expert finds good information and then shares that
  - "Better to send a Facebook message than sending a text"

- Computers versus phones
  - Some issues with texts
  - Computers are more accessible
  - Depends on who you're contacting for the cost
  - Some people don't have 24/7 access to Facebook
  - People are 50/50 on which they prefer
  - Local calls are much cheaper than messages online
- E-Portsocial
  - Lack of access
  - "Only about 20% of students have Internet at home"
  - 350N$ for Internet (for the 3G Internet)
  - Full time students on campus have access
  - Education for Sustainable Development has been heard of though
  - Improves class interaction
  - Lecturer could jump in on a discussion
  - Like Facebook but for school
- Confusion point: Is it called E-Portsocial or Education for Sustainable Development?
- Government Loan Laptop program
  - Part time students are assumed to have laptops?
- Students are required to attend 80% of classes or they are in danger of failing
- Concerns
  - I don't want to put too much online
    - Privacy concerns are real, despite the safe guards
  - Time concerns are also an issue
  - Don't want to deal with ads

- Make sure it's clean and has no spam
- Annoying to spend the time to login and then not have anything new
- Online registration is non-obvious

❖ Mobile Learning

- That sounds very attractive
- A few have Internet on their phones
- Group chats can be expensive

❖ Student Recommendations

- Improve education about these tools
- Increase awareness
- Potentially make use mandatory
  - Online exams
- Have the lecturers make the first move
- Have good features
- Updates should be in one concentrated place
- Textbook access online?
  - Definitely other course materials online
  - Notes online, as well as more training tools

❖ "We see it on the website, but have to ask what's that all about"

Appendix F: MyPoly and E-Portsocial Logos

Figure 16: New Logo for MyPoly

Figure 17: New Logo for E-Portsocial

Appendix G: MyPoly Awareness Flyer

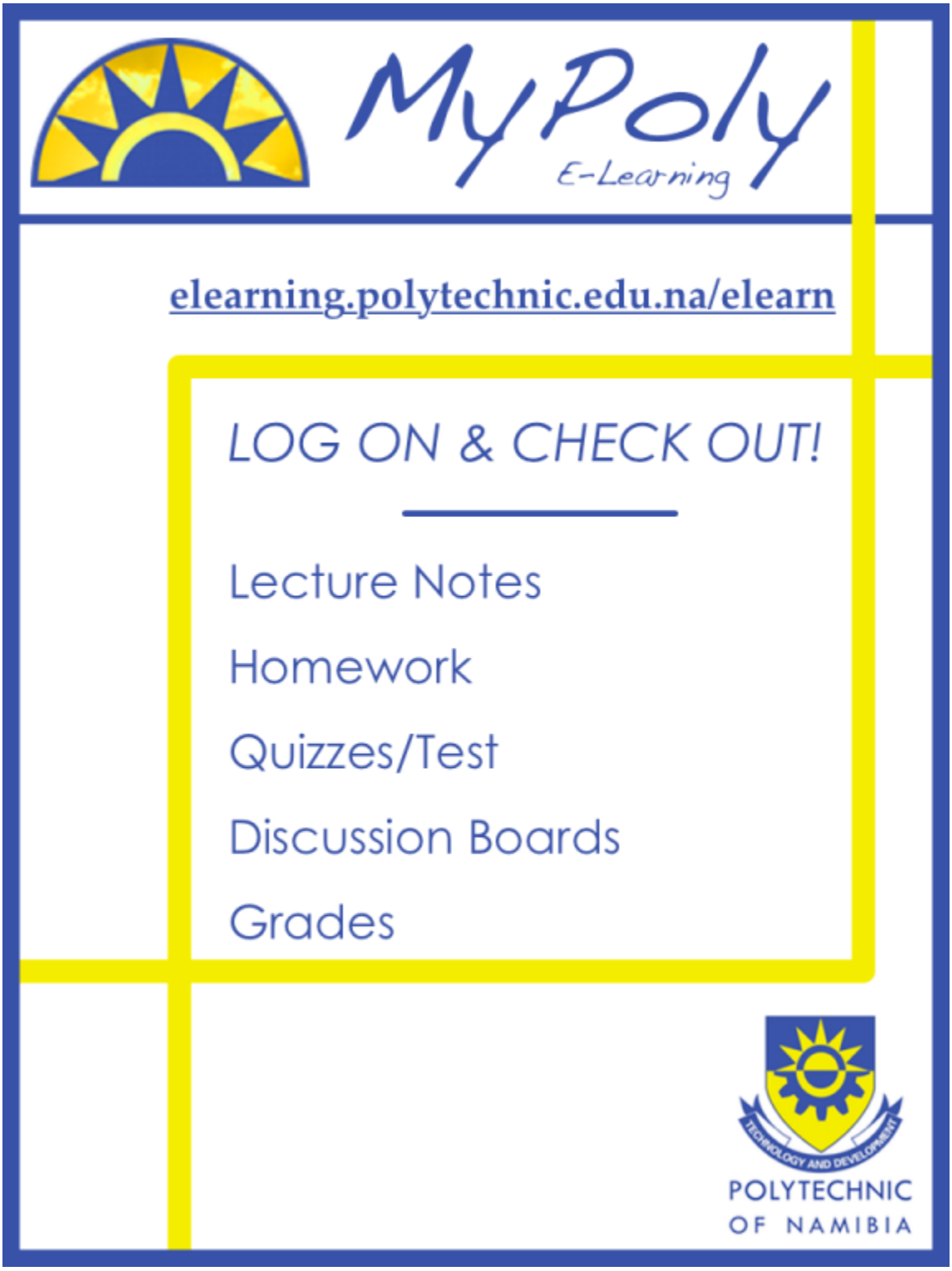

Figure 18: Awareness Flyer for MyPoly

Appendix H: E-Portsocial Awareness Flyer

Figure 19: Awareness Flyer for E-Portsocial

Appendix I: Mobile Learning Awareness Poster

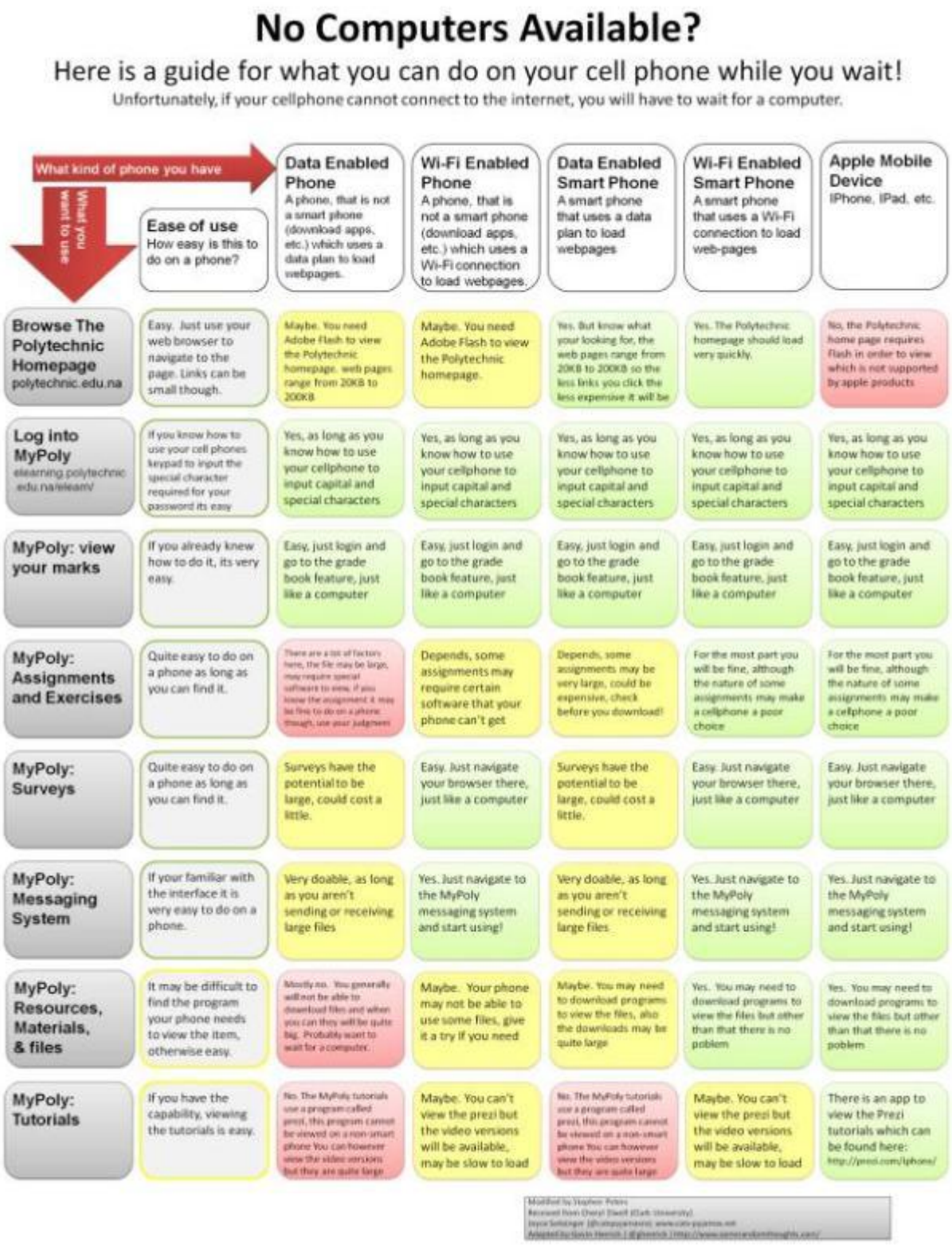

Figure 20: Mobile Learning Functions

Appendix J: PHP code to add or delete a workshop from the database

```
<html>
<body>
<?php
 //connect to the database
 mysql_connect("127.0.0.1", "form", "@c@P0ly") or die(mysql_error());
 mysql_select_db("workshop_db") or die(mysql_error());

 //execute if nothing was posted to the web page (first time user views the page
 if(empty($_POST)){
        echo "Welcome! To create a new workshop, enter data in each of the feilds below and click submit:<br><br>";

        // HTML code to set up the form
        $html = "<form action='edit_workshops.php' method='post'>
                <div>Start Date (yyyy-mm-dd): <input type='text' name='start_date'></div>
                        <div>End Date (yyyy-mm-dd): <input type='text' name='end_date'></div>
                        <div>Day(s) of Sessions: <input type='text' name='day_of_sessions'></div>
                        <div>Time of Day (hh:mm:ss): <input type='text' name='time_of_day'></div>
                        <div>Length of Session (hh:mm:ss): <input type='text' name='length'></div>
                        <div>Description: <input type='text' name='description'></div>
                        <div>Location: <input type='text' name='location'></div>
                        <div><input type='submit'></form></div><br><br>";
        echo $html;

        echo "To delete a workshop, select it from the list below and click the submit button.<br> Be careful, this will also delete all attendance records assosiated with this workshop:<br><br>";

  // query the database for a list of active workshops
  $query="SELECT * FROM Workshops ORDER BY Topic, Start_Date;";
  $result = mysql_query($query) or die(mysql_error());
  $workshops = array();

  // HTML code to set up the table containing the info on the retreived list of databases
  $html = "<form action='edit_workshops.php' method='post'>
                <table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
                <td>Day(s) of Session</td><td>Start Date</td><td>Length</td>
                <td>Description</td><td>Location</td><td>Remove</td></tr>";

  // iterate through the array of workshops adding each to the table
  while ($row = mysql_fetch_assoc($result)){
                $html .= "<tr>";
    foreach($row as $entry){
        $html .= "<td>$entry</td>";
    }
    $html .= "<td><input type='checkbox' name='Workshops[]' value=$row[Workshop_Id]></tr>";
  }
  $html .= "</table><input type='submit'></form>";
  echo $html;
 }

 // code to be executed if a Workshops variable is in the post array
 // this will happen when the user deletes a workshop
 else if (array_key_exists('Workshops', $_POST)){
        $aWorkshop = $_POST['Workshops'];
        $N = count($aWorkshop);

        // for each workshop the user checked to delete first delete and attendance
        // entries that have a FK constraint to this workshop then delete the workshop
        for($i=0; $i < $N; $i++) {
                $Workshop = intval($aWorkshop[$i]);
                $query = "DELETE FROM Attendance where Workshop_Id = $Workshop;";
                $result = mysql_query($query) or die(mysql_error());
                $query = "DELETE FROM Workshops where Workshop_Id = $Workshop;";
        $result = mysql_query($query) or die(mysql_error());
        }
```

```
		// display the same form as the previous section, with the deleted workshops removed.
		echo "The Deletions have been made. To create a new workshop, enter data in each of the feilds below and click submit:<br><br>";
		$html = "<form action='edit_workshops.php' method='post'>
			<div>Start Date (yyyy-mm-dd): <input type='text' name='start_date'></div>
				<div>End Date (yyyy-mm-dd): <input type='text' name='end_date'></div>
				<div>Day(s) of Sessions: <input type='text' name='day_of_sessions'></div>
				<div>Time of Day (hh:mm:ss): <input type='text' name='time_of_day'></div>
				<div>Length of Session (hh:mm:ss): <input type='text' name='length'></div>
				<div>Description: <input type='text' name='description'></div>
				<div>Location: <input type='text' name='location'></div>
				<div><input type='submit'></form></div><br><br>";
		echo $html;

		echo "To delete a workshop, select it from the list below and click the submit button.<br> Be careful, this will also delete all attendance records assosiated with this workshop:<br><br>";
	 $query="SELECT * FROM Workshops ORDER BY Topic, Start_Date;";
	 $result = mysql_query($query) or die(mysql_error());
	 $workshops = array();
	 $html = "<form action='edit_workshops.php' method='post'>
				<table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
				<td>Day(s) of Session</td><td>Start Date</td><td>Length</td>
				<td>Description</td><td>Location</td><td>Remove</td></tr>";
	 while ($row = mysql_fetch_assoc($result)){
				$html .= "<tr>";
	  foreach($row as $entry){
		$html .= "<td>$entry</td>";
	  }
	  $html .= "<td><input type='checkbox' name='Workshops[]' value=$row[Workshop_Id]></tr>";
	 }
	 $html .= "</table><input type='submit'></form>";
	 echo $html;
	}

	// otherwise, the user must have opted to create a new workshop
	else {
	 // retreive all the information
		$start_date = $_POST['start_date'];
		$end_date = $_POST['end_date'];
		$day_of_week = $_POST['day_of_sessions'];
		$time_of_day = $_POST['time_of_day'];
		$length = $_POST['length'];
		$description = $_POST['description'];
		$location = $_POST['location'];

	 // Check to ensure that the information entered will work in the database
		$any_error = 0;
		$error = array(0, 0, 0, 0, 0, 0, 0);
		if(!preg_match("/^(19|20)\d\d-(0[1-9]|1[012])-(0[1-9]|[12][0-9]|3[01])$/", $start_date)){
			$error[0] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^(19|20)\d\d-(0[1-9]|1[012])-(0[1-9]|[12][0-9]|3[01])$/", $end_date)){
			$error[1] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^[a-zA-Z ,]+$/", $day_of_week)){
		echo test;
			$error[2] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^([01]\d|2[0-3]):[0-5][0-9]:[0-5][0-9]$/", $time_of_day)){
			$error[3] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^([01]\d|2[0-3]):[0-5][0-9]:[0-5][0-9]$/", $length)){
			$error[4] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^[a-zA-Z0-9 ]+$/", $description)){
			$error[5] = 1;
			$any_error = 1;
		}
		if(!preg_match("/^[a-zA-Z0-9 ]+$/", $location)){
```

```
                $error[6] = 1;
                $any_error = 1;
        }

 // if one of the things the user entered did not pass the regex test above, do nothing
 // but display the form again with an error message at each of the entries that was
 // in error.
        if($any_error){
                echo "There were errors in you entries, enter data in each of the feilds below and click submit.<br> Be careful, this will also delete all attendance records assosiated with this workshop:<br><br>";

                $html = "<form action='edit_workshops.php' method='post'>
                <div>Start Date (yyyy-mm-dd): <input type='text' name='start_date'>";

                if($error[0]){
                        $html .= " The start date must be in year-month-day (yyyy-mm-dd) format";
        }

        $html .= "</div><div>End Date (yyyy-mm-dd): <input type='text' name='end_date'>";

        if($error[1]){
                $html .= " The end date must be in year-month-day (yyyy-mm-dd) format";
        }

        $html .= "</div><div>Day(s) of Sessions: <input type='text' name='day_of_sessions'>";

        if($error[2]){
                $html .= " The Day(s) of Sessions can contain only letters, commas, and spaces";
        }

        $html .= "</div><div>Time of Day (hh:mm:ss): <input type='text' name='time_of_day'>";

        if($error[3]){
                $html .= " The time of day must be in hours:minutes:seconds (hh:mm:ss) format";
        }

                $html .= "</div><div>Length of Session (hh:mm:ss): <input type='text' name='length'>";

        if($error[4]){
                $html .= " The length must be in hours:minutes:seconds (hh:mm:ss) format";
        }

        $html .= "</div><div>Description: <input type='text' name='description'>";

        if($error[5]){
                $html .= " the description can contain only letters, numbers, and spaces";
        }

        $html .= "</div><div>Location: <input type='text' name='location'>";

        if($error[6]){
                $html .= " the Location can contain only letters, numbers, and spaces";
        }

        $html .= "</div><div><input type='submit'></form></div><br><br>";
        echo $html;

        echo "To delete a workshop, select it from the list below and click the submit button.<br> Be careful, this will also delete all attendance records assosiated with this workshop:<br><br>";
        $query="SELECT * FROM Workshops ORDER BY Topic, Start_Date;";
        $result = mysql_query($query) or die(mysql_error());
        $workshops = array();
        $html = "<form action='edit_workshops.php' method='post'>
                <table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
                <td>Day(s) of Session</td><td>Start Date</td><td>Length</td>
                <td>Description</td><td>Location</td><td>Remove</td></tr>";
        while ($row = mysql_fetch_assoc($result)){
                        $html .= "<tr>";
        foreach($row as $entry){
                $html .= "<td>$entry</td>";
        }
        $html .= "<td><input type='checkbox' name='Workshops[]' value=$row[Workshop_Id]></tr>";
        }
```

```
		$html .= "</table><input type='submit'></form>";
		echo $html;
		}

		// if there was no error in the users entry, add the workshop to the database and show
		// the form once again
		else {
		  // query to add the workshop to the database
			$query = "INSERT INTO Workshops VALUES (null, '$start_date', '$end_date', '$day_of_week', '$time_of_day', '$length',
'$description', '$location');";
			$result = mysql_query($query) or die(mysql_error());

			// display the form as before.
			echo "Thanks! To create a new workshop, enter data in each of the feilds below and click submit:<br><br>";
			$html = "<form action='edit_workshops.php' method='post'>
			<div>Start Date (yyyy-mm-dd): <input type='text' name='start_date'></div>
				<div>End Date (yyyy-mm-dd): <input type='text' name='end_date'></div>
				<div>Day(s) of Sessions: <input type='text' name='day_of_sessions'></div>
				<div>Time of Day (hh:mm:ss): <input type='text' name='time_of_day'></div>
				<div>Length of Session (hh:mm:ss): <input type='text' name='length'></div>
				<div>Description: <input type='text' name='description'></div>
				<div>Location: <input type='text' name='location'></div>
				<div><input type='submit'></form></div><br><br>";
			echo $html;

			echo "To delete a workshop, select it from the list below and click the submit button.<br> Be careful, this will also delete
all attendance records assosiated with this workshop:<br><br>";
		$query="SELECT * FROM Workshops ORDER BY Topic, Start_Date;";
		$result = mysql_query($query) or die(mysql_error());
		$workshops = array();
		$html = "<form action='edit_workshops.php' method='post'>
			<table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
			<td>Day(s) of Session</td><td>Start Date</td><td>Length</td>
			<td>Description</td><td>Location</td><td>Remove</td></tr>";
		while ($row = mysql_fetch_assoc($result)){
				$html .= "<tr>";
		foreach($row as $entry){
			$html .= "<td>$entry</td>";
		}
		$html .= "<td><input type='checkbox' name='Workshops[]' value=$row[Workshop_Id]></tr>";
		}
		$html .= "</table><input type='submit'></form>";
		echo $html;
  }
 }
?>
</body>
</html>
```

Appendix K: PHP Code for Form Lecturers use to Register for a Workshop

```
<html>
<body>
<?php
 //Connect to the database
 mysql_connect("127.0.0.1", "form", "@c@P0ly") or die(mysql_error());
 mysql_select_db("workshop_db") or die(mysql_error());

 // if the post feild is empty, will happen the first time a user navigates to the page
 if(empty($_POST)){
 echo "Welcome! Please fill out the following information about yourself and select the workshops you are interested in attending:<br><br>";

        //query for all workshops that haven't already finished.
  $query="SELECT * FROM Workshops Where End_Date > CURDATE()
                ORDER BY Topic, Start_Date;";
  $result = mysql_query($query);
  $workshops = array();

  //HTML code for creating the form for lecturer information and the table that contains
  //a list of workshops to be selected
  $html = "<form action='register.php' method='post'>
                <div>Faculty Number: <input type='text' name='id_num'></div>
                        <div>First Name: <input type='text' name='fname'></div>
                        <div>Surname:  <input type='text' name='sname'></div>
                        <div>School:        <input type='text' name='school'></div>
                        <div>Department: <input type='text' name='department'></div>
                        <div>Office Room Number:<input type='text' name='room_num'</div><br><br>
                        Select any of the following workshops:<br>
                <table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
                <td>Day(s) of Sessions</td><td>Start Time</td><td>Length (hours)</td>
                <td>Description</td><td>Location</td><td>Sign Up</td></tr>";

  //for each workshop returned add it to the table
  while ($row = mysql_fetch_assoc($result)){
                $html .= "<tr>";
   foreach($row as $entry){
        $html .= "<td>$entry</td>";
   }
   $html .= "<td><input type='checkbox' name='Workshops[]' value=$row[Workshop_Id]></tr>";
  }
  $html .= "</table><input type='submit'></form>";
  echo $html;
 }

 //If the post feild is not empty, the user tried to register for a workshop
 else {
  // get the information
        $anInstructor = $_POST['id_num'];
        $fname = $_POST['fname'];
        $sname = $_POST['sname'];
        $school = $_POST['school'];
        $department = $_POST['department'];
        $room_num = $_POST['room_num'];

  // check to make sure all the entries will work in the database
        $any_error = 0;
        $error = array(0, 0, 0, 0, 0, 0);
        if(!preg_match("/^[0-9]+$/", $anInstructor)){
                $error[0] = 1;
                $any_error = 1;
        }
        if(!preg_match("/^[a-zA-Z ]+$/", $fname)){
```

```
                $error[1] = 1;
                $any_error = 1;
        }
        if(!preg_match("/^[a-zA-Z ]+$/", $sname)){
                $error[2] = 1;
                $any_error = 1;
        }
        if(!preg_match("/^[a-zA-Z ]+$/", $school)){
                $error[3] = 1;
                $any_error = 1;
        }
        if(!preg_match("/^[a-zA-Z ]+$/", $department)){
                $error[4] = 1;
                $any_error = 1;
        }
        if(!preg_match("/^[a-zA-Z0-9 ]+$/", $room_num)){
                $error[5] = 1;
                $any_error = 1;
        }

 // if some of the regex tests failed, do nothing and display the form again with error
 // messages on the feilds that failed
        if($any_error){
                echo "There were errors in you entries, Please fill out the following information about yourself and select the workshops
you are interested in attending.: <br><br>";

                $query="SELECT * FROM Workshops Where End_Date > CURDATE() ORDER BY Topic, Start_Date;";
                $result = mysql_query($query) or die(mysql_error());
                $i = 0;
                $workshops = array();

                $html = "<form action='register.php' method='post'> <div>Faculty Number: <input type='text' name='id_num'>";

                if($error[0]){
                        $html .= " Your faculty number can conly contain numbers (0-9)";
        }

        $html .= "</div><div>First Name: <input type='text' name='fname'>";

        if($error[1]){
                $html .= " Your first name can contain only letters and spaces";
        }

        $html .= "</div><div>Surname: <input type='text' name='sname'>";

        if($error[2]){
                $html .= " Your Surname can contain only letters and spaces";
        }

        $html .= "</div><div>School: <input type='text' name='school'>";

        if($error[3]){
                $html .= " Your school can contain only letters and spaces";
        }

                $html .= "</div><div>Department: <input type='text'name='department'>";

        if($error[4]){
                $html .= " Your department can contain only letters and spaces";
        }

        $html .= "</div><div>Office Room Number: <input type='text' name='room_num'>";

        if($error[5]){
                $html .= " Your room bumber can contain only letters, numbers, and spaces";
        }

        $html .= "</div><table border='1'><tr><td>Workshop ID</td><td>Start
 Date</td> <td>End Date</td><td>Day(s) of Sessions</td><td>Start
 Time</td> <td>Length
 (hours)</td><td>Description</td><td>Location</td><td>Sign Up</td>
 </tr>";
```

```
	while ($row = mysql_fetch_assoc($result)){
		$html .= "<tr>";
		$workshops[$i] = array(); $j = 0;
		foreach($row as $entry) {
			$workshops[$i][$j] = $entry; $j++; $html .= "<td>$entry</td>";
		}
		$html .= "<td><input type='checkbox' name='Workshops[]'value=$row[Workshop_Id]></tr>";
		$i++;
	}
	$html .= "</table><input type='submit'></form>";
	echo $html;
 }

	// Otherwise, the user entered valid data
	else {
		$anInstructor = intval($_POST['id_num']);
		$fname = $_POST['fname'];
		$sname = $_POST['sname'];
		$school = $_POST['school'];
		$department = $_POST['department'];
		$room_num = $_POST['room_num'];

		//check to see if the lecturer was already in the system
		$query = "SELECT * FROM Instructors WHERE Faculty_Number = $anInstructor;";
		$result = mysql_query($query) or die(mysql_error());
		$num=mysql_numrows($result);

		// if the instructor is not in the system, add them
		if($num == 0) {
			$query="INSERT INTO Instructors Values ($anInstructor, '$sname', '$fname', '$school', '$department',
'$room_num');";
			$result=mysql_query($query) or die(mysql_error());
		}

		// if they are check to see if there are differences in what they entered and what
		// was stored
		else {
			$row = mysql_fetch_assoc($result);
			$anyDifference = 0;
			$Differences = array(0, 0, 0, 0, 0);
			if ($row['FirstName'] != $fname){
				$anyDifference = 1;
				$Differences[0] = 1;
			}
			if ($row['LastName'] != $sname){
				$anyDifference = 1;
				$Differences[1] = 1;
			}
			if ($row['School'] != $school){
				$anyDifference = 1;
				$Differences[2] = 1;
			}
			if ($row['Department'] != $department){
				$anyDifference = 1;
				$Differences[3] = 1;
			}
			if ($row['Room_Num'] != $room_num){
				$anyDifference = 1;
				$Differences[4] = 1;
			}

			// if there are any differences, update to the new values and inform the user
			// that his or her information has changed
			if($anyDifference) {
				$query = "UPDATE Instructors Set LastName='$sname', FirstName='$fname', School='$school',
Department='$department', Room_Num='$room_num' WHERE Faculty_Number = $anInstructor;";
				$result = mysql_query($query) or die(mysql_error());
				if ($Differences[0]){
					$Text = $row['FirstName'];
					echo "The first name you entered is different from what we had on record, it has been
changed from $Text to $fname <br>";
				}
				if ($Differences[1]){
```

```
                                        $Text = $row['LastName'];
                                        echo "The surname you entered is different from what we had on record, it has been changed from $Text to $sname <br>";
                                }
                                if ($Differences[2]){
                                        $Text = $row['School'];
                                        echo "The school you entered is different from what we had on record, it has been changed from $Text to $school <br>";
                                }
                                if ($Differences[3]){
                                        $Text = $row['Department'];
                                        echo "The department you entered is different from what we had on record, it has been changed from $Text to $department <br>";
                                }
                                if ($Differences[4]){
                                        $Text = $row['LastName'];
                                        echo "The office room number you entered is different from what we had on record, it has been changed from $Text to $room_num <br>";
                                }
                                echo "<br>";

                        }
                }

                // now for each workshop that was selected add the users to the attendance table
                $aWorkshop = $_POST['Workshops'];
                $N = count($aWorkshop);
                $n = 0;
                for($i=0; $i < $N; $i++)
                {
                $Workshop = intval($aWorkshop[$i]);
                $query="SELECT * FROM Attendance WHERE Faculty_Number = $anInstructor AND Workshop_Id = $Workshop;";
                $result = mysql_query($query) or die(mysql_error());
                $num = mysql_numrows($result);
                if($num == 0){
                        $query="INSERT INTO Attendance VALUES ($anInstructor, $Workshop, null);";
                                $result = mysql_query($query) or die(mysql_error());
                                $n++;
                        }
                }

                // display info on the successful registration
                if ($n == 0) {
                        echo "You did not register for any new workshops, here is your schedule:";
                }
                else if ($n == 1){
                echo "You registered for $n new workshop, here is your schedule:";
                }
                else {
                echo "You registered for $n workshops, here is your schedule:";
                }

                //display all of the workshops that the user is currently sign up for that haven't
                //already finished
                $query="SELECT Workshops.Workshop_Id, Start_Date, End_Date, Day_Of_Week, Time_Of_Day, Length, Topic, Location FROM Workshops INNER JOIN Attendance ON Workshops.Workshop_Id=Attendance.Workshop_Id WHERE Attendance.Faculty_Number = $anInstructor AND End_Date > CURDATE() ORDER BY Start_Date;";
                $result=mysql_query($query) or die(mysql_error());
                $html="<table border='1'><tr><td>Workshop ID</td><td>Start Date</td><td>End Date</td>
                <td>Day(s) of Sessions</td><td>Start Time</td><td>Length (hours)</td>
                <td>Description</td><td>Location</td></tr>";
                while ($row = mysql_fetch_assoc($result)){
                        $html .= "<tr>";
                foreach($row as $entry){
                $html .= "<td>$entry</td>";
                }
                $html .= "</tr>";
        }
                $html .= "</table>";
                echo $html;
        }
}
```

```
?>
</body>
</html>
```

Appendix L: Database Schema

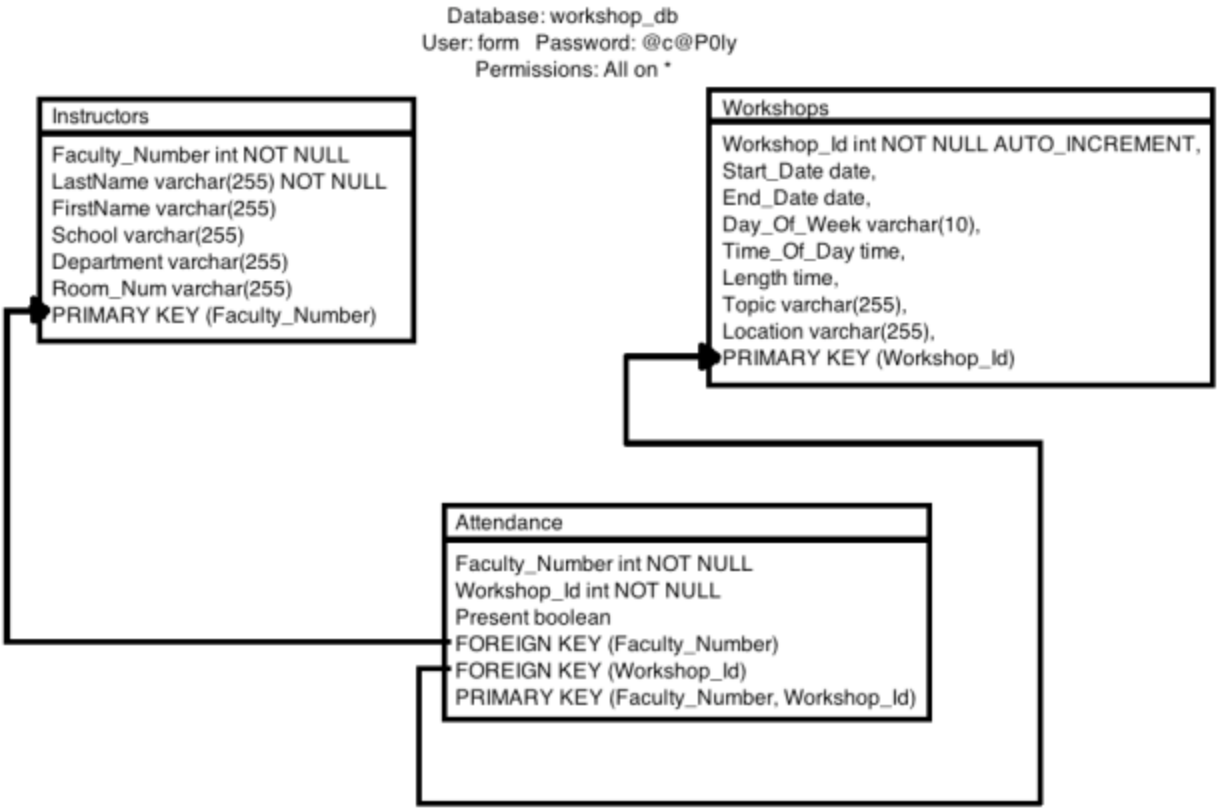

Figure 21: Database Schema for the Workshop Sign-up Tool

Appendix M: Tutorial Series Links

How to Navigate to MyPoly:

http://prezi.com/-z5yal1zdmml/how-to-navigate-to-mypoly/?kw=view--z5yal1zdmml&rc=ref-12296870

Login:

http://prezi.com/qht6owkfoq9l/login-to-mypoly/?kw=view-qht6owkfoq9l&rc=ref-12296870

After Login:

http://prezi.com/yvjuzzoi-pcl/mypoly-after-login/?kw=view-yvjuzzoi-pcl&rc=ref-12296870

Course homepage:

http://prezi.com/voer97ffneip/course-homepage-overview/?kw=view-voer97ffneip&rc=ref-12296870

Messaging System:

http://prezi.com/vqjxnh0boczx/messaging-system/?kw=view-vqjxnh0boczx&rc=ref-12296870

Assignments & Exercises:

http://prezi.com/57jne62su1f6/assignments-exercises/?kw=view-57jne62su1f6&rc=ref-12296870

Blogs:

http://prezi.com/y_ss1tt_ldi7/blogs/?kw=view-y_ss1tt_ldi7&rc=ref-12296870

Study Materials:

http://prezi.com/mk1nsddxdtaq/study-materials/?kw=view-mk1nsddxdtaq&rc=ref-12296870

Private Files:

http://prezi.com/ul3hxsq3zb7h/private-files/?kw=view-ul3hxsq3zb7h&rc=ref-12296870

Course Information:

http://prezi.com/dpqia6fvwqjt/course-information/?kw=view-dpqia6fvwqjt&rc=ref-12296870

Calendar:

http://prezi.com/keav1kcccpre/calendar/?kw=view-keav1kcccpre&rc=ref-12296870

Gradebook:

http://prezi.com/qvbx_dqv06kd/gradebook/?kw=view-qvbx_dqv06kd&rc=ref-12296870

Discussion Forum:

http://prezi.com/j6prfilccgbf/discussion-forum/?kw=view-j6prfilccgbf&rc=ref-12296870

Student Survey:

http://prezi.com/ufqgfkfsublj/student-surveys/?kw=view-ufqgfkfsublj&rc=ref-12296870

Resources:

http://prezi.com/9p0xr0nu3e4v/resources/?kw=view-9p0xr0nu3e4v&rc=ref-12296870